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Deelrapport 2.13 : 13-uursmeting Sediview op 11/03/2008 tijdens springtij - Liefkenshoek (transect K)

Report 2.13 : Through Tide Measurement Sediview on 11/03/2008 during spring tide - Liefkenshoek (transect K)

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1. INTRODUCTION

1.1. The assignment

This report is part of the set of reports describing the results of the long-term measurements This report is part of the set of reports describing the results of the long-term measurements conducted in Deurganckdok aiming at the monitoring and analysis of silt accretion. This measurement campaign is an extension of the study "Extension of the study about density currents in the Beneden Zeeschelde" as part of the Long Term Vision for the Scheldt estuary. It is complementary to the study 'Field measurements high-concentration benthic suspensions (HCBS 2)'.

The terms of reference for this study were prepared by the 'Departement Mobiliteit en Openbare Werken van de Vlaamse Overheid, Afdeling Waterbouwkundig Laboratorium' (16EB/05/04). The repetition of this study was awarded to International Marine and Dredging Consultants NV in association with WL|Delft Hydraulics and Gems International on 10/01/2006. The project term was prolonged with an extra year from April 2007 till March 2008.

Waterbouwkundig Laboratorium– Cel Hydrometrie Schelde provided data on discharge, tide, salinity and turbidity along the river Scheldt and provided survey vessels for the long term and through tide measurements. Afdeling Maritieme Toegang provided maintenance dredging data. Agentschap voor Maritieme Dienstverlening en Kust – Afdeling Kust and Port of Antwerp provided depth sounding measurements.

The execution of the study involves a twofold assignment:

- Part 1: Setting up a sediment balance of Deurganckdok covering a period of one year, i.e. 04/2007 – 03/2008
- Part 2: An analysis of the parameters contributing to siltation in Deurganckdok

1.2. Purpose of the study

The Lower Sea Scheldt (Beneden Zeeschelde) is the stretch of the Scheldt estuary between the Belgium-Dutch border and Rupelmonde, where the entrance channels to the Antwerp sea locks are located. The navigation channel has a sandy bed, whereas the shallower areas (intertidal areas, mud flats, salt marshes) consist of sandy clay or even pure mud sometimes. This part of the Scheldt is characterized by large horizontal salinity gradients and the presence of a turbidity maximum with depth-averaged concentrations ranging from 50 to 500 mg/l at grain sizes of 60 - 100 μm. The salinity gradients generate significant density currents between the river and the entrance channels to the locks, causing large siltation rates. It is to be expected that in the near future also the Deurganckdok will suffer from such large siltation rates, which may double the amount of dredging material to be dumped in the Lower Sea Scheldt.

Results from the study may be interpreted by comparison with results from the HCBS and HCBS2 studies covering the whole Lower Sea Scheldt. These studies included through-tide measurement campaigns in the vicinity of Deurganckdok and long term measurements of turbidity and salinity in and near Deurganckdok.

The first part of the study focuses on obtaining a sediment balance of Deurganckdok. Aside from natural sedimentation, the sediment balance is influenced by the maintenance and capital dredging works. This involves sediment influx from capital dredging works in the Deurganckdok, and internal relocation and removal of sediment by maintenance dredging works. To compute a sediment balance an inventory of bathymetric data (depth soundings), density measurements of the

deposited material and detailed information of capital and maintenance dredging works will be made up.

The second part of the study is to gain insight in the mechanisms causing siltation in Deurganckdok, it is important to follow the evolution of the parameters involved, and this on a long and short term basis (long term & through-tide measurements). Previous research has shown the importance of water exchange at the entrance of Deurganckdok is essential for understanding sediment transport between the dock and the river Scheldt.

1.3. Overview of the study

1.3.1. Reports

Reports of the project 'Opvolging aanslibbing Deurganckdok' between April 2007 till March 2008 are summarized in Table 1-1. An overview of the HCBS2 and 'Opvolging aanslibbing Deurganckdok' (between April 2006 till March 2007) reports are given in APPENDIX K.

This report 2.13, is one of a set of reports that gains insight in sediment and water transport between Deurganckdok and the river Scheldt, which belongs to the second part of this project.

Table 1-1: Overview of Deurganckdok Reports

Report	Description
Sediment Balance: Bathymetry surveys, Density measurements, Maintenance and construction dredging activities	
1.10	Sediment Balance: Three monthly report 1/4/2007 - 30/06/2007 (I/RA/11283/07.081/MSA)
1.11	Sediment Balance: Three monthly report 1/7/2007 – 30/09/2007 (I/RA/11283/07.082/MSA)
1.12	Sediment Balance: Three monthly report 1/10/2007 – 31/12/2007 (I/RA/11283/07.083/MSA)
1.13	Sediment Balance: Three monthly report 1/1/2007 – 31/03/2007 (I/RA/11283/07.084/MSA)
1.14	Annual Sediment Balance (I/RA/11283/07.085/MSA)
Factors contributing to salt and sediment distribution in Deurganckdok: Salt-Silt (OBS3A) & Frame measurements, Through tide measurements (SiltProfiling & ADCP) & Calibrations	
2.09	Calibration stationary equipment autumn (I/RA/11283/07.095/MSA)
2.10	Through tide measurement Siltprofiler 23 October 2007 (I/RA/11283/07.086/MSA)
2.11	Through tide measurement Salinity Profiling winter (I/RA/11283/07.087/MSA)
2.12	Through tide measurement Sediview winter 11 March 2008 Transect I (I/RA/11283/07.088/MSA)
2.13	Through tide measurement Sediview winter 11 March 2008 Transect K (I/RA/11283/07.089/MSA)
2.14	Through tide measurement Sediview winter 11 March 2008 Transect DGD (I/RA/11283/07.090/MSA)
2.15	Through tide measurement Siltprofiler 12 March 2008 (I/RA/11283/07.091/MSA)
2.16	Salt-Silt distribution Deurganckdok summer (21/6/2007 – 30/07/2007) (I/RA/11283/07.092/MSA)
2.17	Salt-Silt distribution & Frame Measurements Deurganckdok autumn (17/09/2007 - 10/12/2007) (I/RA/11283/07.093/MSA)

Report	Description
2.18	Salt-Silt distribution & Frame Measurements Deurganckdok winter (18/02/2008 - 31/3/2008) (I/RA/11283/07.094/MSA)
2.19	Calibration stationary & mobile equipment winter (I/RA/11283/07.096/MSA)
Boundary Conditions: Upriver Discharge, Salt concentration Scheldt, Bathymetric evolution in access channels, dredging activities in Lower Sea Scheldt and access channels	
3.10	Boundary conditions: Three monthly report 1/4/2007 – 30/06/2007 (I/RA/11283/07.097/MSA)
3.11	Boundary conditions: Three monthly report 1/7/2007 – 30/09/2007 (I/RA/11283/07.098/MSA)
3.12	Boundary conditions: Three monthly report 1/10/2007 – 31/12/2007 (I/RA/11283/07.099/MSA)
3.13	Boundary conditions: Three monthly report 1/1/2008 – 31/03/2008 (I/RA/11283/07.100/MSA)
3.14	Boundary conditions: Annual report (I/RA/11283/07.101/MSA)
Analysis	
4.10	Analysis of Siltation Processes and Factors (I/RA/11283/07.102/MSA)

1.3.2. Measurement actions

Following measurements have been carried out during the course of this project:

1. Monitoring upstream discharge in the Scheldt river
2. Monitoring Salt and sediment concentration in the Lower Sea Scheldt taken from on permanent data acquisition sites at Lillo, Oosterweel and up- and downstream of the Deurganckdok.
3. Long term measurement of salt distribution in Deurganckdok.
4. Long term measurement of sediment concentration in Deurganckdok
5. Monitoring near-bed processes in the central trench in the dock, near the entrance as well as near the landward end: near-bed turbidity, near-bed current velocity and bed elevation variations are measured from a fixed frame placed on the dock's bed.
6. Measurement of current, salt and sediment transport at the entrance of Deurganckdok for which ADCP backscatter intensity over a full cross section are calibrated with the Sediview procedure and vertical sediment and salt profiles are recorded with the SiltProfiler equipment
7. Through tide measurements of vertical sediment concentration profiles -including near bed highly concentrated suspensions- with the SiltProfiler equipment. Executed over a grid of points near the entrance of Deurganckdok.
8. Monitoring dredging activities at entrance channels towards the Kallo, Zandvliet and Berendrecht locks
9. Monitoring dredging and dumping activities in the Lower Sea Scheldt

In situ calibrations were conducted on several dates to calibrate all turbidity and conductivity sensors, a description can be found in IMDC (2006a; 2007a; 2008f; 2008o).

1.4. Structure of the report

This report is the factual data report of the through tide measurements upstream of Deurganckdok on the 11th of March 2008. The first chapter comprises an introduction. The second chapter describes the measurement campaign and the equipment. Chapter 3 describes the course of the actual measurements. The results and processed data are presented in Chapter 4, whereas chapter 5 gives a preliminary analysis of the data.

2. THE MEASUREMENT CAMPAIGN

2.1. Overview of the parameters

The first part of the study aims at determining a sediment balance of Deurganckdok and the net influx of sediment. The sediment balance comprises a number of sediment transport modes: deposition, influx from capital dredging works, internal replacement and removal of sediments due to maintenance dredging (Figure 2-1).

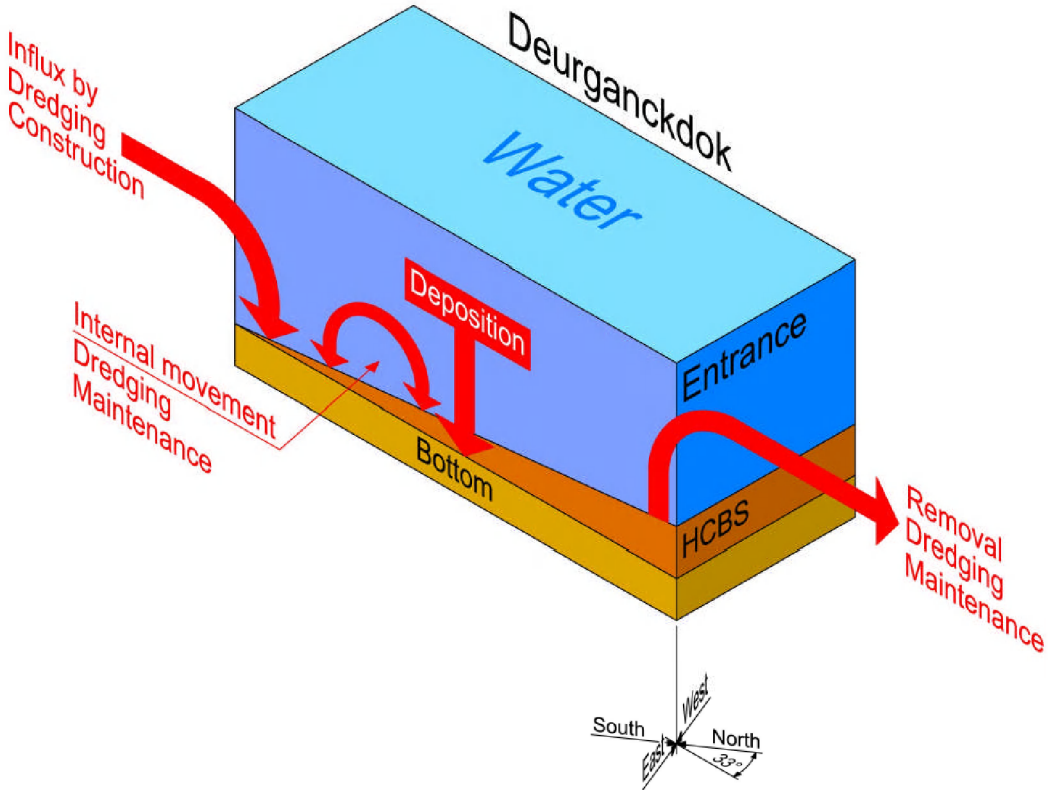


Figure 2-1: Elements of the sediment balance

A net deposition can be calculated from a comparison with a chosen initial condition t_0 (Figure 2-2). The mass of deposited sediment is determined from the integration of bed density profiles recorded at grid points covering the dock. Subtracting bed sediment mass at t_0 leads to the change in mass of sediments present in the dock (mass growth). Adding cumulated dry matter mass of dredged material removed since t_0 and subtracting any sediment influx due to capital dredging works leads to the total cumulated mass entered from the Scheldt river since t_0.

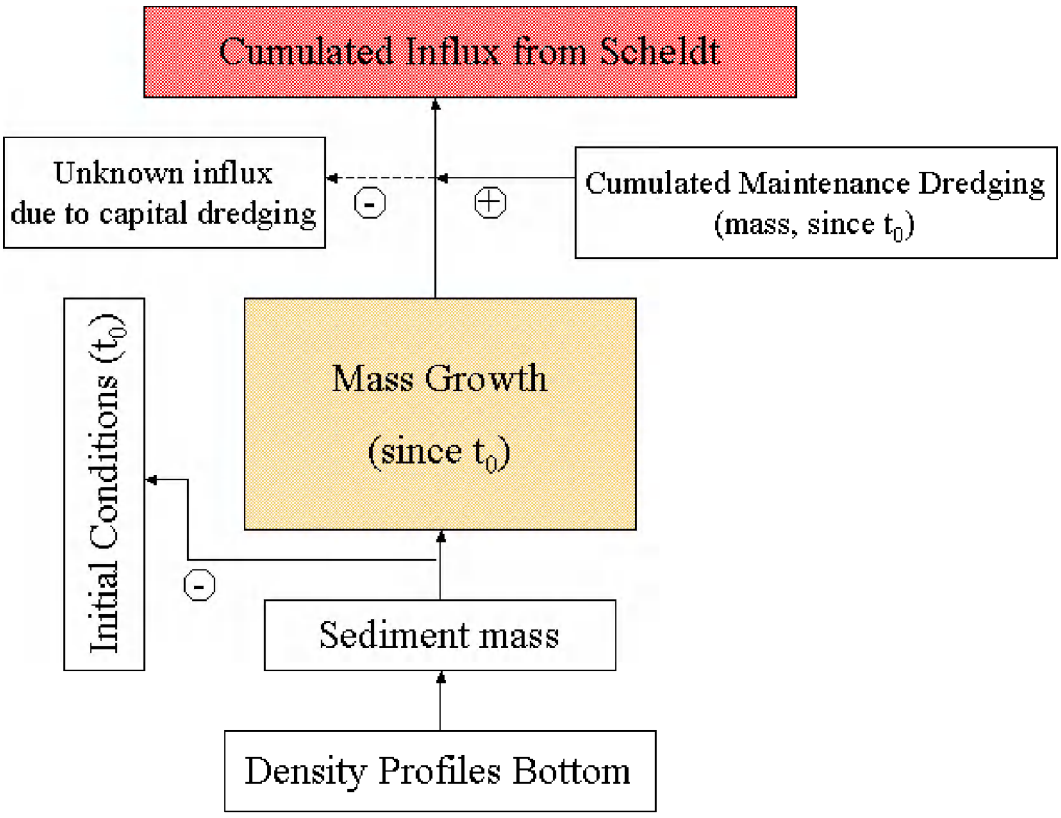


Figure 2-2: Determining a sediment balance

The main purpose of the second part of the study is to gain insight in the mechanisms causing siltation in Deurganckdok. The following mechanisms will be aimed at in this part of the study:

- Tidal prism, i.e. the extra volume in a water body due to high tide
- Vortex patterns due to passing tidal current
- Density currents due to salt gradient between the Scheldt river and the dock
- Density currents due to highly concentrated benthic suspensions

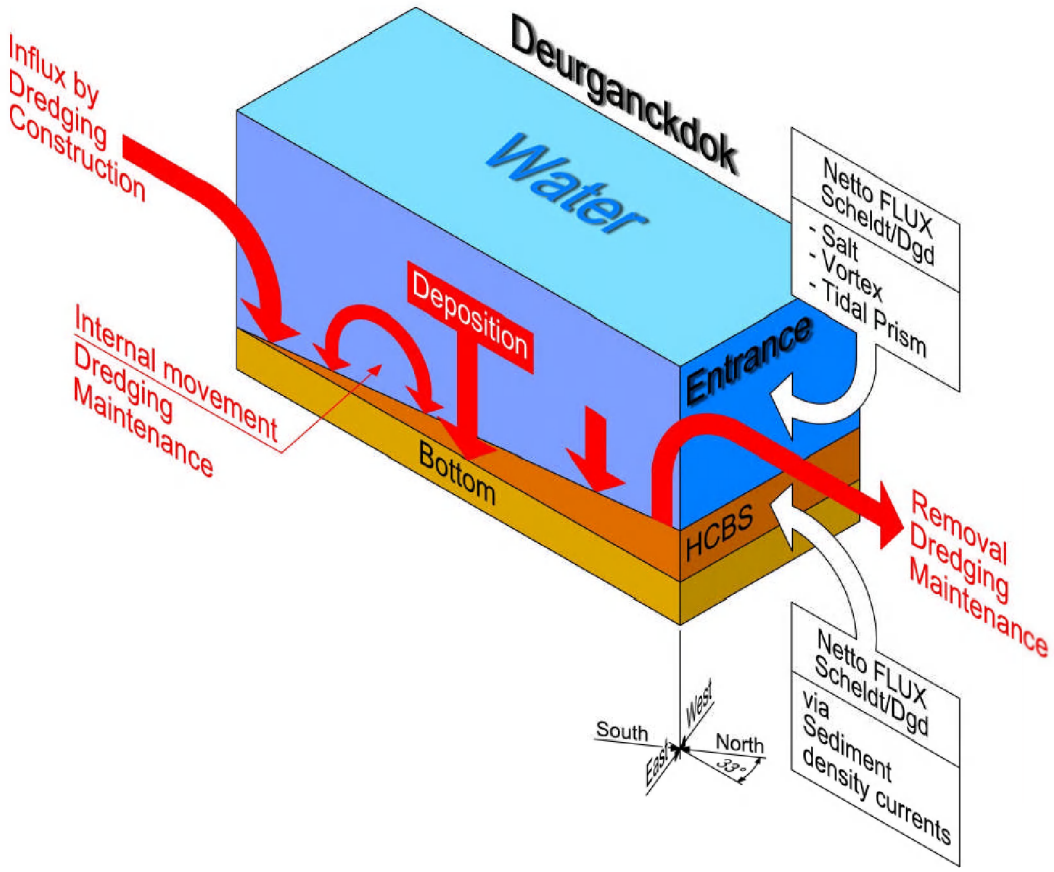


Figure 2-3: Transport mechanisms

These aspects of hydrodynamics and sediment transport have been landmark in determining the parameters to be measured during the project. Measurements will be focussed on three types of timescales: one tidal cycle, one neap-spring cycle and seasonal variation within one year.

Following data are being collected to understand these mechanisms:

- Monitoring the freshwater input (discharge) from the tributaries into the river Scheldt.
- Monitoring salinity and sediment concentration in the Lower Sea Scheldt at permanent measurement locations at Oosterweel, up- and downstream of the Deurganckdok.
- Long term measurement of salinity and suspended sediment distribution in Deurganckdok.
- Monitoring near-bed processes (current velocity, turbidity, and bed elevation variations) in the central trench in the dock, near the entrance as well as near the current deflecting wall location.
- Dynamic measurements of flow pattern, salinity and sediment transport at the entrance of Deurganckdok.
- Through tide measurements of vertical sediment concentration profiles -including near bed high concentrated benthic suspensions.
- Monitoring dredging activities at the entrance channels towards the Kallo, Zandvliet and Berendrecht locks as well as dredging and dumping activities in the Lower Sea Scheldt and Deurganckdok in particular.

In situ calibrations were conducted on several dates to calibrate all turbidity and conductivity sensors.

2.2. Description of the measurement campaign

2.2.1. Purpose of the measurement campaign

The purpose of the measurements was to determine the cross-section distribution of the suspended sediment concentration, sediment flux, flow velocity and water discharge over a sailed transect K during a complete tidal cycle. The final purpose is to make a water and a sediment balance from the river Scheldt at Deurganckdok during a tidal cycle by integrating the water discharge and sediment flux.

To get up a water and sediment balance at Deurganckdok, 3 transects were sailed during the same tidal cycle on the 11th of March at the river Scheldt (Figure 2-4): at the entrance of Deurganckdok (transect DGD), upstream of Deurganckdok (transect I) and downstream of Deurganckdok (transect K). This report focuses on the through tide measurements downstream of Deurganckdok (transect K) and the two others measurement campaigns are described in IMDC reports 2008j and 2008k.

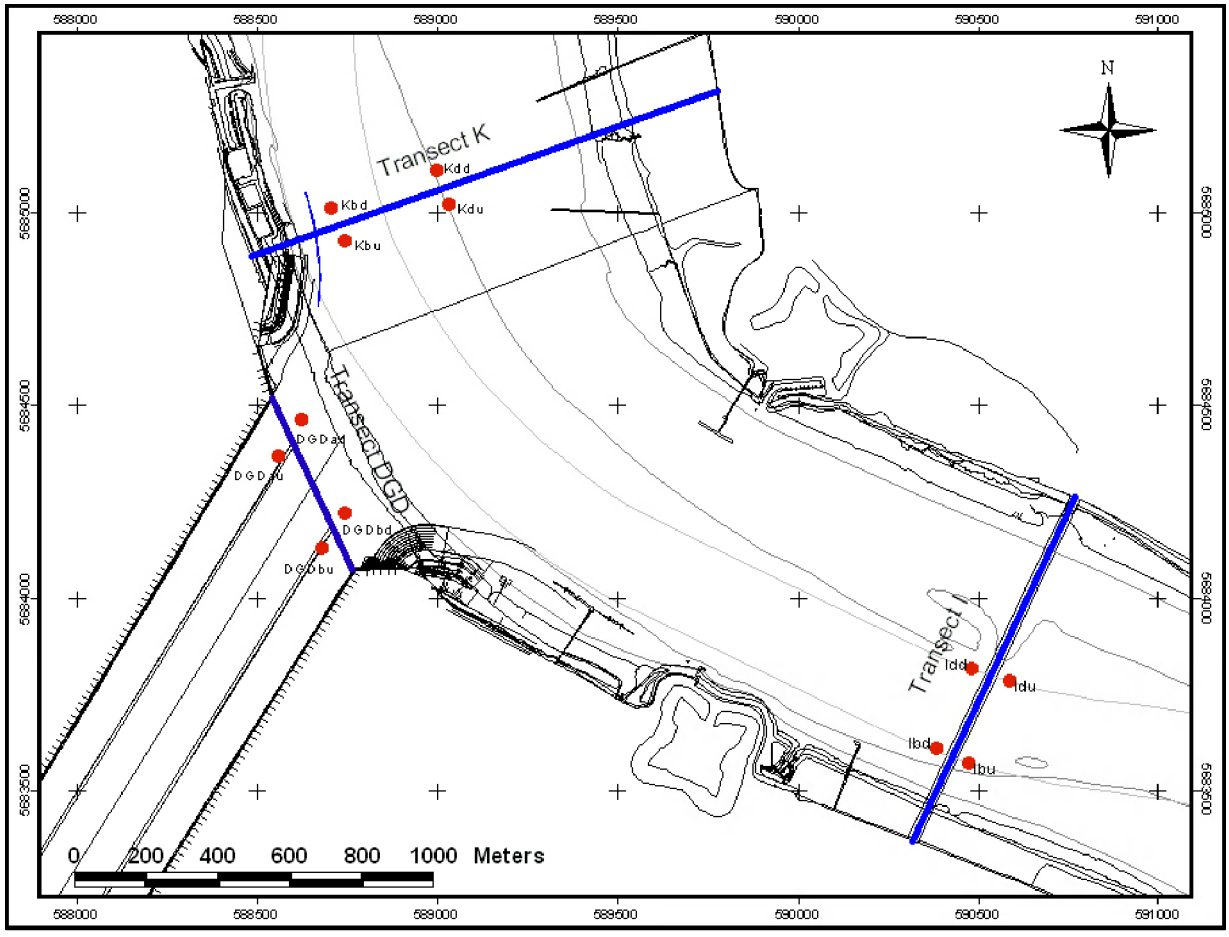


Figure 2-4: Map of sailed transect and calibration points at Deurganckdok on 11th of March 2008

2.2.2. Measurement procedure

Flow velocity, Turbidity, Salinity and Temperature measurements were conducted on the 11th of March from 7h00 MET until 20h00 MET. From the survey vessel Veremans a measurement cycle was completed every 30 minutes. The vessel with a mounted ADCP sailed a fixed transect from the right bank to the left bank and vice versa as a short backup transect (Table 2-1). Profiles were gathered to calibrate the ADCP transects for temperature, salinity and suspended sediment concentration to be used in Sediview.

Two calibration profiles were collected for each transect (Table 2-2):

- One before sailing the transect at the bank where the start of the transect was
- One after sailing the transect at the bank where the transect ended

During these calibrations, a fish with a CTD-OBS was lowered to the bottom. The downcast was interrupted at three depths, one in the upper half of the water column (between 4 and 7 m from the water surface), one at 4 meters above the bottom and the last one at the water bottom. At the two first depths samples were taken for calibration, and are used as 'ground truth' for all suspended sediment concentration measurements (OBS and Sediview). The turbidity measurement at the third depth is used to estimate the SS concentration at the bottom (see 4.2.4.1.2). The other instruments logged continuously during the downcast. Conductivity, Temperature and Depth was logged by the CTD-probe, while turbidity was recorded by the OBS.

Table 2-1:Transect of the Flow Measurements on 11th of March 2008 (UTM31 ED50)

Measurement location	Left Bank Easting	Left Bank Northing	Right Bank Easting	Right Bank Northing	Avg Length [m]	Avg Course [degr.]
Transect I	590 318	5 683 302	590 771	5 684 557	1057	25
Transect DGD	588 541	5 684 527	588 765	5 684 056	521	335
Transect K	588 484	5 684 924	589 775	5 685 384	1371	70

Table 2-2: Positions of the calibration points for 11th of March 2008 during flood and ebb.

Measurement point	Bank	Easting (UTM31 ED50)	Northing (UTM31 ED50)
Flood			
Ibu	Left	590476	5683514
Idu	Right	590589	5683744
DGDau	Left	588561	5684369
DGDbu	Right	588682	5684113
Kbu	Left	588746	5684965
Kdu	Right	589033	5685066
Ebb			
Ibd	Left	590384	5683557
Idd	Right	590485	5683778
DGDad	Left	588623	5684470
DGDbd	Right	588745	5684214
Kbd	Left	588706	5685055
Kdd	Right	588999	5685160

2.3. The equipment

2.3.1. ADCP

The current measurements were conducted using an RD Instruments ADCP 600 kHz Workhorse. For positioning the GPS onboard the vessel Veremans was used. For the measurement of the heading a gyrocompass was installed.

This 600 KHz ADCP system was mounted on a steel pole underneath the central axis of the vessel. The transducer set was looking vertically downwards to the bottom. Transceiver unit and computer system were connected to peripherals such as the differential GPS-receiver, the heave compensator and the gyrocompass.

During the measurements the ADCP constantly measured upstream from the vessel. The acquisition software of Winriver was used. The main settings are given in Table 2-3.

Table 2-3: Main Configuration Settings of ADCP

Main configuration settings of ADCP 600kHz Worhhorse:
Cell depth: 0.5 m
Number of cells: 50
Number of Water pings per ensemble: 2
Number of Bottom Track pings per ensemble: 2
Time between ensembles: 0
Averaging: None
Speed of Sound: Fixed 1500 m/s
Salinity 0 psu
3-beam solution: enabled

2.3.2. OBS - CTD

A D&A type OBS 3A was used to measure depth, conductivity, temperature and turbidity.

Measured parameters by the OBS 3A sensor: temperature (°C), conductivity (µS/cm), absolute pressure (m), turbidity (NTU).

On Veremans the OBS 3A device was mounted on a towfish. The resulting record is filled-up with GPS-time, sample number, and planimetric position of the GPS-receiver. Sampling frequency is 1 reading per second.

The technical details on the OBS 3A are given in the winter calibration Report of the HCBS 1 measurement campaign. (IMDC, 2006a)

2.3.3. Pump Sampler

A water sampler was attached nearby the turbidity sensor taking water samples. Samples were collected in 1 litre sampling bottles. The pumping speed of the water sampler was tested at the start of the measurement campaign on board. Dye was used to time the duration between the intake of the dye and exit at the sampling end of the sampler on board. The duration between intake and exit at the end was 24 seconds. Around 8h45 MET the hose was screwed into the propeller so a new sampling period had to be measured with the shorter hose: 18 seconds.

3. COURSE OF THE MEASUREMENTS

3.1. Measurement periods

At Deurganckdok ADCP tracks were sailed once every 15 minutes for 13 hours, in total 52 cross-sections.

Calibration profiles were taken at 2 locations (left bank, right bank). During every cycle, 1 calibration profile was taken serving as the second calibration of the previous transect and as the first calibration point of the current transect, resulting in a total of 42 profiles. APPENDIX A gives the start and end points of the tracks, the sailed length and the course.

3.2. Hydro-meteorological conditions during the measurement campaign

3.2.1. Vertical tide during the measurements

The vertical tide was measured at the Liefkenshoek tidal gauges. Graphs of the tide at Liefkenshoek on the 11th March of 2008 can be found in APPENDIX B. Table 3-1 gives the most important characteristics (high and low tide) of the tide at those gauges on the 11th of March 2008.

Table 3-1: High and low tide at Liefkenshoek on 11/03/2008

Liefkenshoek Tidal Gauge		
11 March 2008		
	Time [MET]	***Water level [m TAW]***
HW (1)	5:00	6.22
LW (2)	12:30	0.08
HW (3)	17:50	5.93

In Table 3-2 the tidal characteristics of the tide on the 11th of March 2008 are compared to the average tide over the decade 1991-2000 (AMT, 2003).

Table 3-2: Comparison of the tidal characteristics of 11/03/2008 with the average tide, the average neap tide and the average spring tide over the decade 1991-2000 for Liefkenshoek.

	Neap tide (1991 - 2000)	***Avg Tide (1991 - 2000)***	***Spring Tide (1991 - 2000)***	***Tide 11/03/2008***
Water level [m TAW]				
HW (1)	4.63	5.19	5.63	6.22
LW (2)	0.39	0.05	-0.18	0.08
HW (3)	-	-	-	5.93
Tidal difference [m]				
Falling (1 to 2)	4.24	5.14	5.81	6.14
Rising (2 to 3)	4.24	5.14	5.81	5.85
Duration [hh:mm]				
Falling (1 to 2)	6:40	6:50	7:02	7:30
Rising (2 to 3)	5:59	5:34	5:16	5:20
Tide (1 to 3)	12:39	12:24	12:18	12:50
Tidal coefficient				
Falling (1 to 2)	0.82	1.00	1.13	1.19
Rising (2 to 3)	0.82	1.00	1.13	1.14

The tidal coefficients from 1.14 up to 1.19 for the measured tide of the 11th of March 2008 indicate that this tide has a larger tidal range than the average tide for the decade of 1991-2000, and can be classified as spring tide.

3.2.2. Meteorological data

Meteorological data at Deurne was obtained from the Weather Underground website (Wunderground, 2008).

The weather on the 11th of March 2008 was stormy and the wind blew from the west at an average velocity of 22 km/h with maximal gust velocity of 67 km/h. The air temperature varied between 5 and 12°C. The sky was cloudy with precipitation.

3.3. Navigation information

An overview of the navigation at the measurement location is given in APPENDIX C.

3.4. Remarks on data

Shipwakes were removed from the data. In the 4th cycle the OBS cable with hose got cut off in the screw so no measurements of the bottom were taken.

4. PROCESSING OF DATASETS

4.1. Calibration of the OBS turbidity sensor

A crucial aspect of the accuracy and reliability of the data concerns the calibration of the OBS turbidity sensor. The calibration of the OBS sensor is necessary to covert turbidity into Suspended Sediment Concentration (SSC). We use here an in situ calibration, which is more representative of the actual measurement conditions at that moment. At some depths water samples were taken by the pump sampler and were analysed by a laboratory for SSC. These SSC were used as 'ground truth' to calibrate the OBS turbidity sensor. The calibration curve can be found in APPENDIX D.

4.2. Methodology of processing of the ADCP data with Sediview

DRL Software's Sediview was used to process the ADCP data. Sediview is designed to derive estimates of suspended sediment concentration throughout the water column using acoustic backscatter data obtained by ADCPs manufactured by RD Instruments of San Diego, California.

4.2.1. Acoustic backscatter theory

The acoustic theory governing backscatter from particles suspended in the water column is complex, but the following simplified formula serves to introduce the main factors that are relevant:

$$E = SL + SV + Constant - 20\log(R) - 2\alpha_w R$$

Where:

- E = echo intensity,
- SL = transmitted power,
- SV = backscatter intensity due to the particles suspended in the water column,
- α_w = a coefficient describing the absorption of energy by the water,
- R = the distance from the transducer to the measurement bin.

The term 20log(R) is a simple geometric function which accounts for the spherical spreading of the beam. The constant is required because each ADCP has specific performance characteristics.

In order to measure the suspended sediment concentration in the water column it is necessary to relate the backscattered sound intensity to the mass concentration in the water. For the purposes of measuring solids concentration on site, it can be shown that the relationship is as follows (derived from Thorne and Campbell, 1992 and Hay, 1991 in DRL (2003)):

$$Log_{10}M_r = \{dB + 2r(\alpha_w + \alpha_s) - K_s\}S^{-1}$$

Where:

- $M(r)$ = mass concentration per unit volume at range, r
- S = relative backscatter coefficient
- K_s = site and instrument constant
- dB = the measured relative backscatter intensity (corrected for beam spreading)
- α_w = water attenuation coefficient
- α_s = sediment attenuation coefficient, which is a function of the effective particle size

In this expression there are four unknowns: *S*, *Ks*, α_w and α_s. These parameters are to be determined within Sediview (APPENDIX F).

4.2.2. Water sampling and transect sailing

To calibrate Sediview for suspended sediment concentration, two water samples are taken at the beginning and at the end of each transect (see 3.1). Both samples are taken within the range of reliable data of the ADCP. For the near-surface sample this means in bin 3 or 4, for the near-bed sample this means at about one or two meter above the sidelobe.

Water sampling is done together with CTD-OBS measurement in order to have two independent suspended sediment concentration measurements for each sample. OBS measurements were compared to the water samples and recalibrated as mentioned in § 4. The water samples were used for Sediview calibration, while cross-calibrated OBS measurements were used as a back up check. The salinity and temperature was used to compute the acoustic water absorption (water attenuation coefficient). All water samples were analysed as is described in 4.2.3.1.

4.2.3. Calibration for suspended sediment concentration within Sediview

4.2.3.1. Calibration workset

The calibration workset consists of ADCP-files, sampling times, sampling depths, SSC obtained from water samples and SSC, temperature and salinity obtained from CTD-OBS readings.

The suspended sediment concentration of the water samples was determined. One-litre samples were filtered over a preweighed desiccated 0.45 micron filter, after which the filter is dried in an oven at 105°C, cooled and weighted (NEN 6484).

4.2.3.2. SSC calibration per ensemble pair

In the Sediview calibration process the following parameters must be defined: the site and instrument constant (Ks), the relative backscatter coefficient (S) and the effective particle size per ensemble-pair (near-surface sample and near-bed sample) in order to fit the Sediview-estimate with the suspended sediment concentration of the water samples. These parameter sets may not differ too much from the previous parameter sets, as the environmental conditions will not change that much over a small time interval. To obtain a smooth progress in time of Ks, S and effective particle size an iterative approach is used.

4.2.4. Sediview configuration

4.2.4.1. Discharge and suspended sediment concentration estimates

The ADCP measures most of the water column from just in front of the ADCP to 6% above the bottom. The shallow layer of water near the bottom is not used to compute discharge and suspended sediment concentration due to side-lobe interference. When the ADCP sends out an acoustic pulse, a small amount of energy is transmitted in side lobes rather than in the direction of the ADCP beam. Side lobe reflection from the bottom can interfere with the water echoes and can give erroneous data. The thickness of the side lobe layer is 6% of the distance from the transducers to the bottom.

Near the banks the water depth is too shallow for the ADCP to profile.

For each of those unmeasured regions, Sediview will make an estimate of the discharges and suspended sediment concentration. The measured and unmeasured regions in the cross section are shown in Figure 4-1 and Figure 4-2.

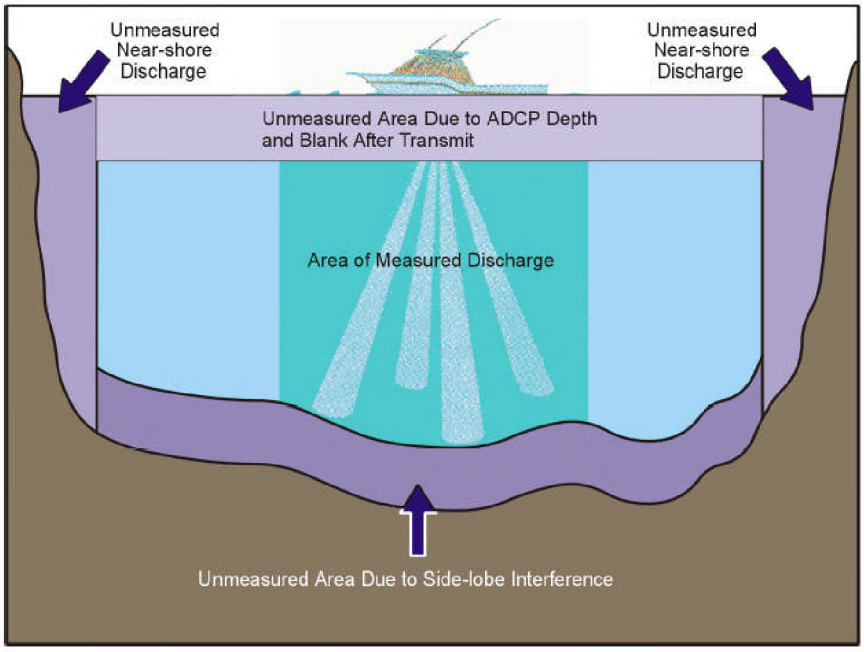


Figure 4-1: Unmeasured regions in the cross section (from RD Instruments, 2003)

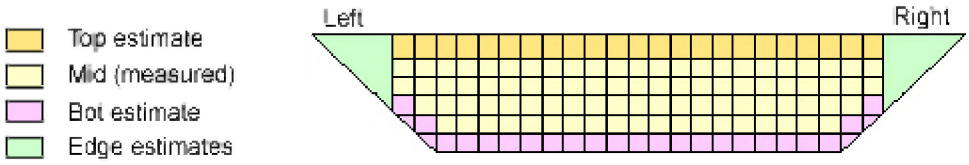


Figure 4-2: Measured and estimated discharges and sediment fluxes within Sediview (DRL, 2005)

4.2.4.1.1 Top/bottom estimates

The sediment concentration and discharge at the top of the water column is assumed to be the same as the concentration and discharge in the first measured bin.

The sediment concentration between the bottom and the lowest valid bin is assumed to be an increase of the lowest valid bin. The SSC increase between the lowest valid bin (position of the sidelobe) and the bottom is calculated from the CTD-OBS profile, which was lowered in the unmeasured sidelobe layer. The CTD-OBS profiles show that the bottom value of the SSC at the calibration points transect K vary during a tidal cycle between approximately 99 and 328 % of the SSC-value at the position of the sidelobe. As the concentration grows approximately linear from the lowest valid bin to the bottom, and as Sediview uses a constant concentration factor for these deepest bins, we use a concentration factor that varies between 100 and 214% (Figure 4-3). An overview of the used power concentration factor is given in APPENDIX F.

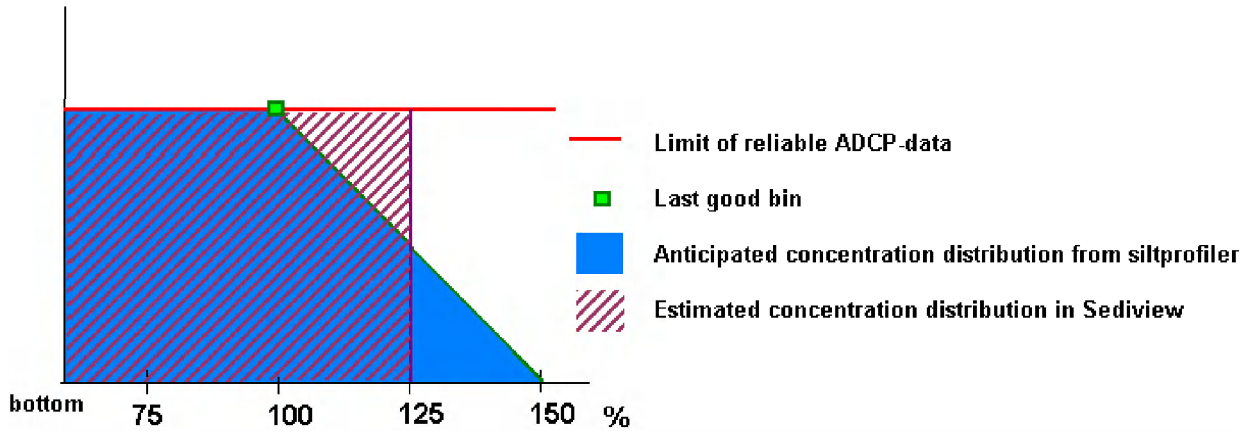


Figure 4-3: Principal of bottom estimate of the sediment concentration in Sediview

Table 4-1: Extrapolation methods for top and bottom variables

Variable	***Top***	***Bottom***
Discharge Method	Constant	Power
Concentration factor	100%	100 - 214%

The discharge for the bottom water layer is estimated by using the power method. Chen (1991) discusses the theory of power laws for flow resistance. Simpson and Oltmann (1990) discuss Chen's power law equivalent of Manning's formula for open channels (with b=1/6) (RD Instruments, 2003).

$$u / u^* = 9.5(z / z_0)^b$$

Where:

- z = Distance to the channel bed [m]
- u = Velocity at distance z from bed [m/s]
- u* = Shear velocity [m/s]
- z_0 = Bottom roughness height [m]
- b = Exponent (1/6)

4.2.4.1.2 Edge estimates

The shape of the edges of the cross section is assumed to be near triangular due to the banks of the river Scheldt. Five data ensembles are to be averaged to determine the left and right bank mean velocities used for calculation of edge estimates.

The distance from start- and endpoint to the bank is calculated from the theoretical start- and endpoint at the bank to the effective start- and endpoint. The theoretical points are taken at the banks.

Table 4-2: Reference points at the end of the mud flats on left and right bank

Coordinates (UTM31 ED50)	***Easting Left bank***	***Northing Left bank***	***Easting Right bank***	***Northing Right bank***
Transect K	588 548	5 684 947	589 535	5 689 950

The formula for determining the near shore discharge is:

$$Q_{shore} = CV_m Ld_m \text{ [m}^3\text{/s]}$$

Where:

C = Coefficient (0.35 for triangular, 0.91 for rectangular shape)

V_m = Mean water velocity in the first or the last segment [m/s]

L = Distance from the shore to the first or the last segment specified by the user [m]

d_m = Depth of the first or the last segment [m]

The coefficient (C) has been set to 0.35 (triangular shape of the banks).

4.2.4.2. Contour plots of the transects

All contour plots show perpendicular and parallel projected values on the straightened sailed transects. The heading of the straightened sailed transect is defined by picking 2 points in the straight part of the line after having corrected the heading of the ADCP compass. The compass offset is derived from a comparison of the ADCPs bottom track with the external GPS data.

4.2.5. Output

General transect information containing start-stop coordinates of each sailed transects with stop time, track length and heading is given in APPENDIX A.

In 0, four contourplots were generated for each transect showing the distribution of suspended sediment concentration & sediment flux as well as the flow velocity perpendicular and parallel to the transect. The following conventions were used:

- Distances on the X-axis were referenced to the starting point of the transect, the start of the sailed transect is always at distance equal to zero.
- Left bank is always shown left, right bank on the right side. For transect DGD, left bank was taken to be the western quay wall and the right bank to be the eastern quay wall considering the dock as being a tributuary to the Scheldt river.
- Perpendicular flow velocities and fluxes are positive for downstream flow (ebb, out of Deurganckdok), negative for upstream flow (flood, inbound).
- Parallel flow velocities are positive for flow going from the left bank to the right bank, and negative for flow going from the right bank to the left bank.
- Absolute Depth is given in meters above TAW.

Also a depth-averaged velocity plot was generated for the flow velocity perpendicular to the transect. (See 0).

Tables in APPENDIX H give the values for discharges and sediment fluxes for the total cross-section and the average measured SSC is shown in APPENDIX I.

- Mid = measured part of the cross-section
- Top = top part of the cross-section
- Bottom = bottom part underneath the sidelobe
- Edge (left, right) = edge estimates to left & right bank
- Total = Mid+Top+Bottom+ Edge values

The graph in APPENDIX J gives the temporal variation of the total flux, total discharge and total measured SSC for the whole through tide measurement at Deurganckdok.

5. PRELIMINARY ANALYSIS OF THE DATA

5.1. March 11th 2008 survey

It appears from the recorded data that the highest water velocities occur near the navigation channel at about 3 hours after HW in which velocities exceed 1 m/s. The total calculated discharge ranges between 350 and -18885 m³/s.

Average cross-section concentrations vary from about 172 up to about 612 mg/l. The highest measured concentration from a watersample is 940 mg/l (recorded near the right bank at 7 meters deep about a 5h25 after HW).

Considering the sediment fluxes APPENDIX J shows that incoming transport is dominating during flood while a residual outgoing sediment transport can be observed from HW until the end of the measurement. The maximal calculated flux during ebb occurs around 4h15 after HW and is about 6463 kg/s. During flood, the highest flux is about -5812 kg/s, 0h51 before HW.

5.2. Intercomparison with earlier surveys on November 17th 2005, March 22nd 2006, September 27th 2006 and October 24th 2007

On November 17th 2005 (HCBS1), March 22nd 2006 5HCB2 winter), September 27th (HCBS2 summer) and October 24th 2007 (DGD2, current report) the same transect has been sailed during through tide measurements, a description is given by IMDC (2005), IMDC (2006c), IMDC (2007c) and IMDC (2008a). Conditions near the entrance of Deurganckdok have been simulated in Delft3D and processed by IMDC (2006g) in order to compare simulation with observed data.

It is important to underline that lower fresh water discharges from the tributaries were recorded during the former measurement campaigns (Figure 5-1, Figure 5-2, Figure 5-3 and Figure 5-4): on 16/11/2005 the discharges prior to the measurements were about 230 m³/s; on 22/03/2006 and 23/03/2006 about 95 m³/s and on 27/09/2006 and 28/09/2006 about 40 m³/s. All measurement days correspond to the mean discharge -1σ, which is rather low (Figure 5-5).

The results presented in Figure 5-5 are based on a long-term simulation over a period of 30 year (1971-2000) with the SIGMA-model for MKBA (IMDC, 2006g). The mean discharge is the annual average ten days' discharge, calculated with simulated long-term measurements. The high and low discharges are also annual ten days' discharges, and are calculated as mean discharge +2σ and mean discharge -2σ.

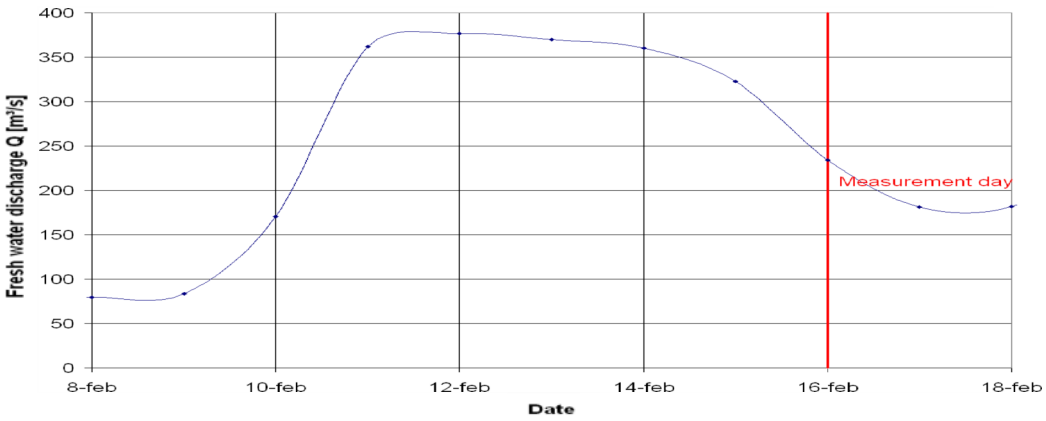


Figure 5-1: Fresh water discharge 8 - 18 February 2005, during HCBS1

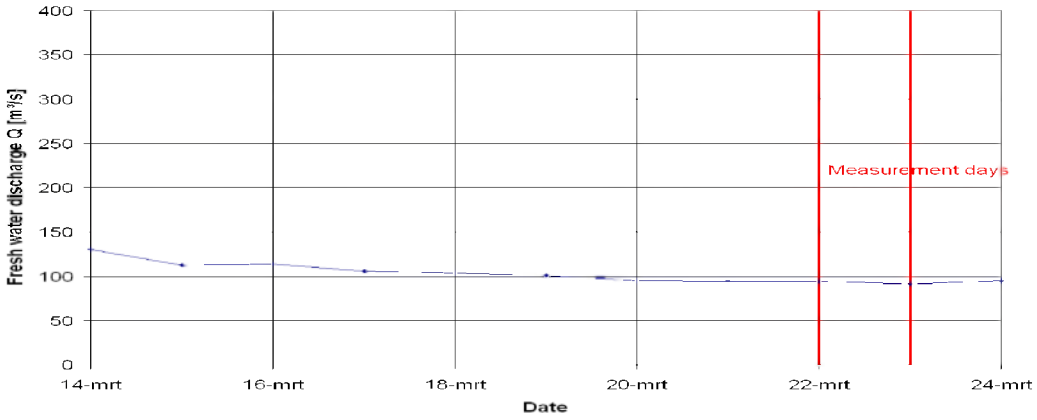


Figure 5-2: Fresh water discharge 15 - 25 March 2006, during HCBS2 winter

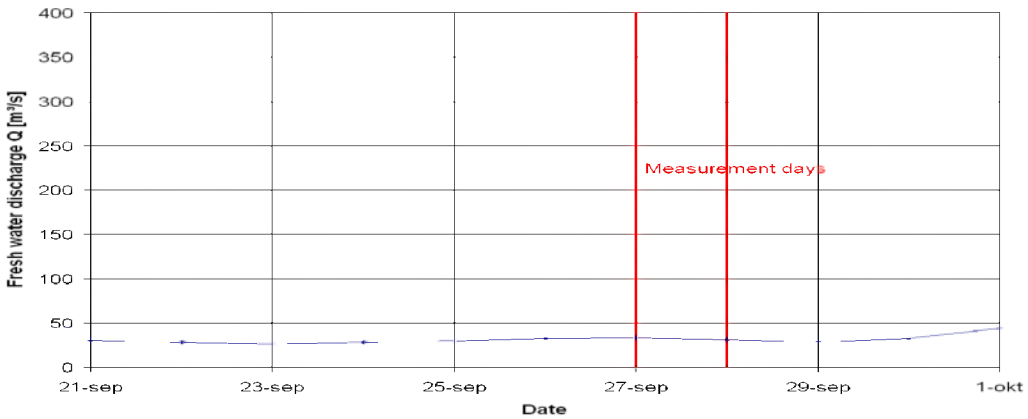


Figure 5-3: Fresh discharge 21 September – 1 October 2006, during HCBS2 summer

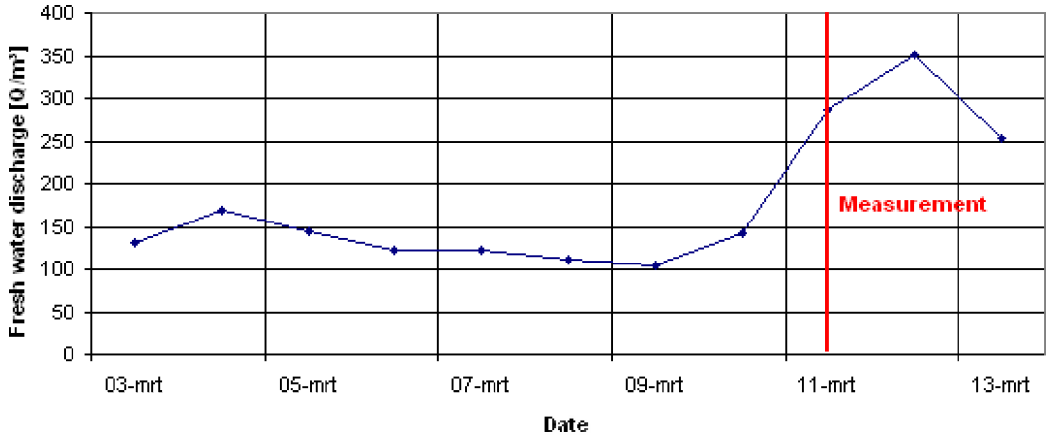


Figure 5-4: Fresh water discharge 3 March – 13 March of 2008, during DGD2

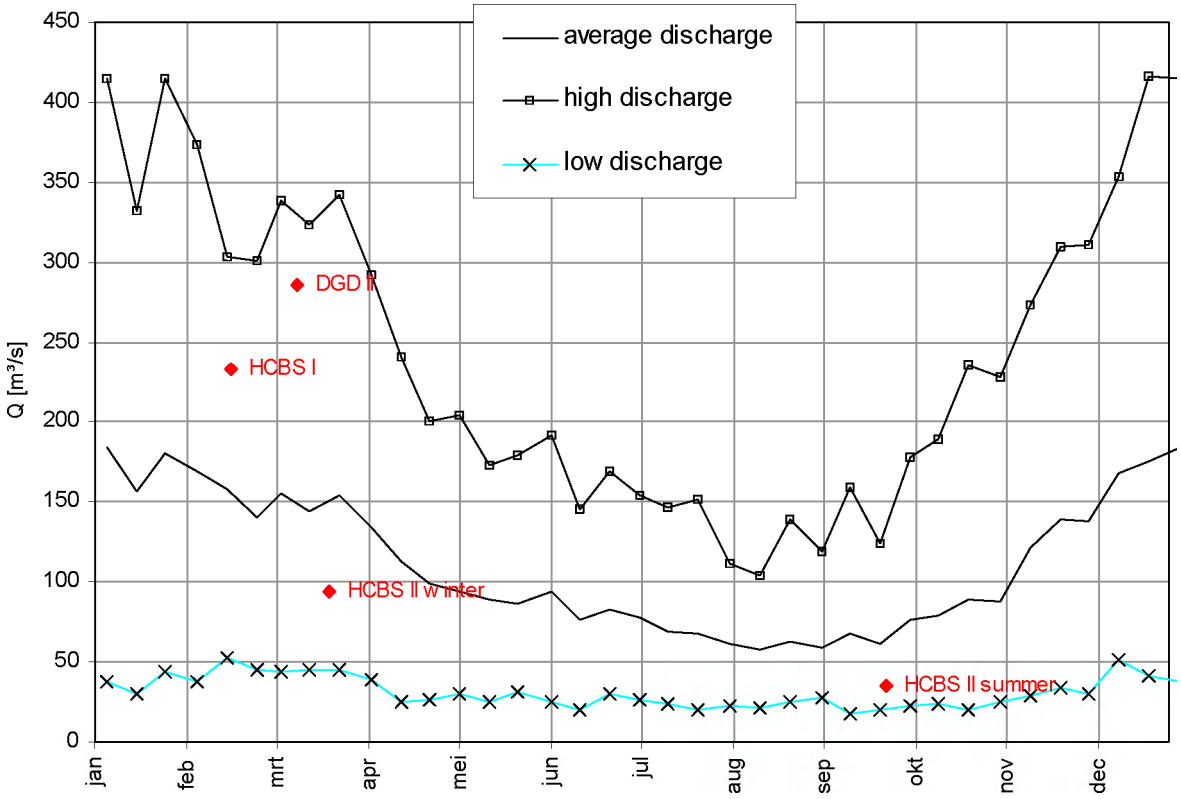


Figure 5-5: Mean fresh water discharge

The fluxes, total discharges and suspended sediment concentrations, of all measurement campaigns at Liefkenshoek are illustrated in Figure 5-6, Figure 5-7 and Figure 5-8. It can be seen that the discharges, fluxes and SS concentrations of this campaign are higher than the previous campaigns.

The volume of water, crossing transect K during flood or ebb on a measurement day, was calculated by integrating the discharge curve (Figure 5-7) during flood and ebb respectively. Table 5-1 shows the results. During flood on the 11th of March 2008, 177.653.000 m³ water crossed transect K and during ebb 212.191.000 m³. Comparing to the other campaigns, the volume during ebb is extreme low and during flood a lot higher. The stormy weather causes this phenomenon.

The mass of the suspended sediment, crossing transect K during flood or ebb on a measurement day, was calculated on a similar manner as the volume. The flux curve was integrated (Figure 5-6) and (Figure 5-8) shows the results. During ebb 11th of May of 2008, 88.476 tonnes SS crossed the transect K and during flood 52.743 tonnes. 35.733 tonnes SS was deposited in the dock during the tidal cycle. Comparing with other campaigns, 35.733 tonnes are a lot. (Table 5-2). Since flux is calculated with discharge and SS concentration, a similar overestimation and underestimation as the water volumes will achieve in the calculated SS masses.

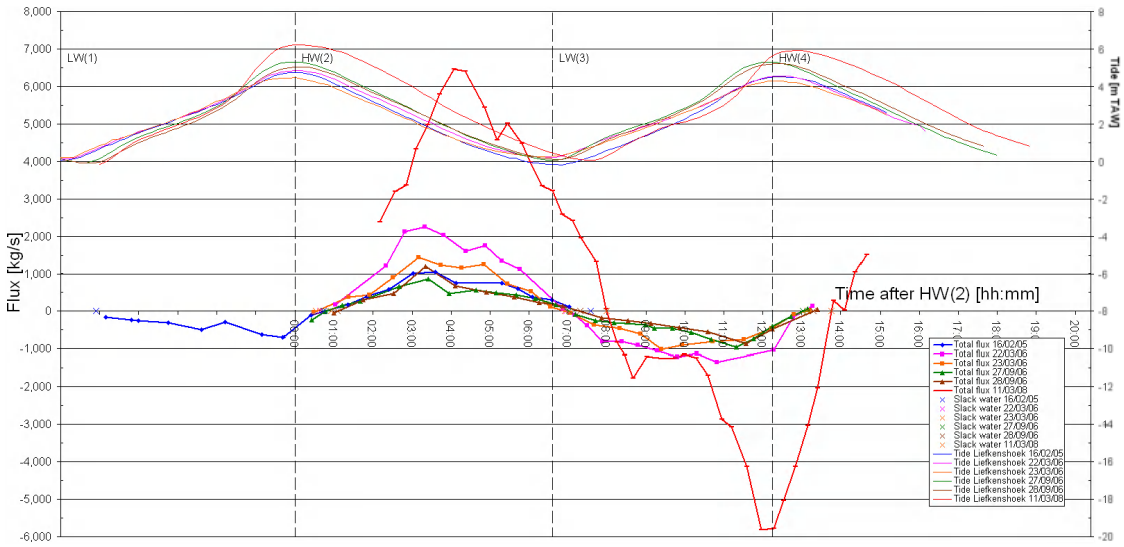


Figure 5-6: Total flux on 16/02/2005 (Neap tide), 22/03/2006 (Neap tide), 23/09/2006 (Neap tide), 27/09/2006 (Average tide), 28/09/2006 (Average tide) & 11/03/2008 (Spring tide)

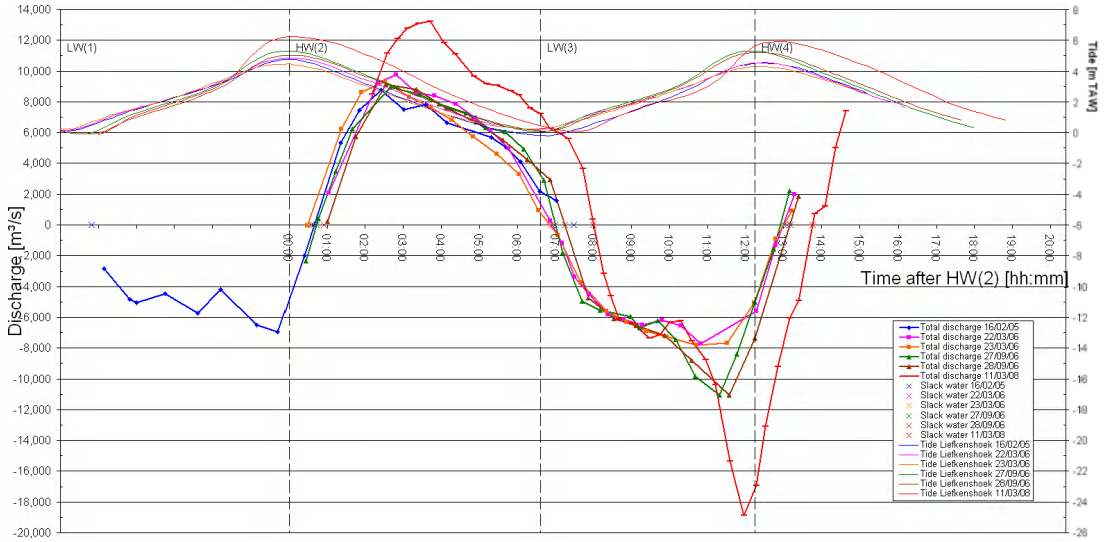


Figure 5-7: Total discharge on 16/02/2005 (Neap tide), 22/03/2006 (Neap tide), 23/09/2006 (Neap tide), 27/09/2006 (Average tide), 28/09/2006 (Average tide) & 11/03/2008 (Spring tide)

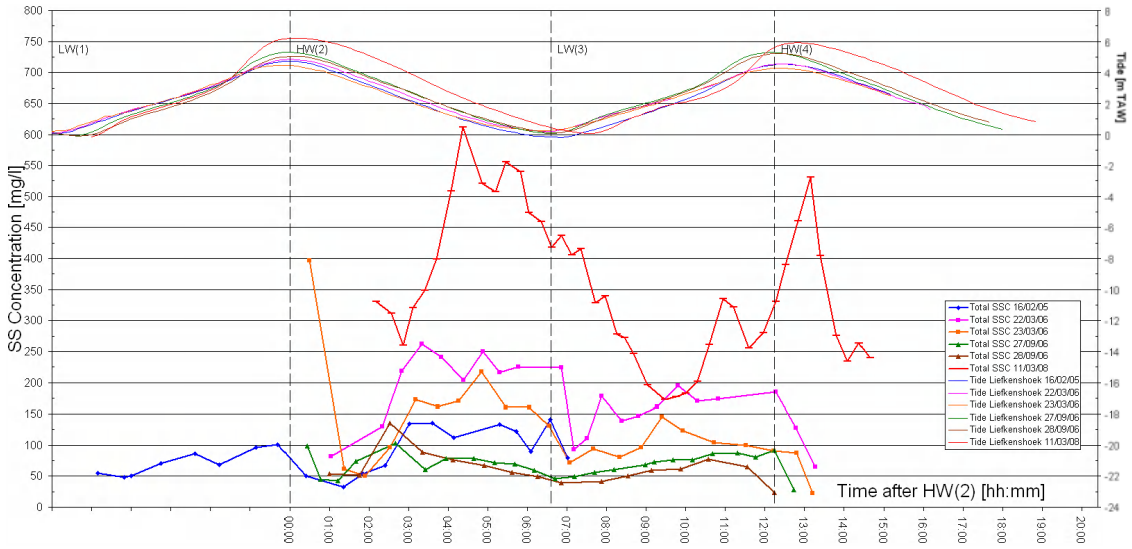


Figure 5-8: SS Concentration 16/02/2005 (Neap tide), 22/03/2006 (Neap tide), 23/09/2006 (Neap tide), 27/09/2006 (Average tide), 28/09/2006 (Average tide) & 11/03/2008 (Spring tide)

Table 5-1: Water volume during ebb, flood and measurement campaign on 16/02/2005 (Neap tide), 22/03/2006 (Neap tide), 23/09/2006 (Neap tide), 27/09/2006 (Average tide), 28/09/2006 (Average tide) & 11/03/2008 (Spring tide)

Measurement Day		16/02/'05	22/03/'06	23/03/'06	27/09/'06	28/09/'06	11/03/'08
Ebb	Volume [1000x m³]	131 650	136 071	131 962	139 360	135 231	212 191
	Duration [HH:MM]	6:50	6:20	6:21	6:17	6:40	7:04
	Tidal Difference [m]	4.95	4.68	4.22	5.26	4.94	6.14
Flood	Volume [1000x m³]	-95 386	-116 707	-120 353	-134 575	-140 558	-177 653
	Duration [HH:MM]	5:50	6:10	6:09	6:01	5:55	5:45
	Tidal Difference [m]	4.68	4.38	4.06	5.24	5.12	5.85
Net	Volume [1000x m³]	36 282	19 364	11 609	4 785	-5 327	34 538
	Duration [HH:MM]	12:40	12:30	12:31	12:18	12:35	12:50
	Discharge [m³/s]	796	430	258	108	-118	748
Fresh water	Volume [1000x m³]	10 679	4 248	4 100	1 453	1 406	13 213
	Duration [HH:MM]	12:40	12:30	12:31	12:18	12:35	12:50
	Discharge [m³/s]	234	94	91	33	31	286

Table 5-2: Suspended solids during ebb, flood and measurement campaign on 16/02/2005 (Neap tide), 22/03/2006 (Neap tide), 23/09/2006 (Neap tide), 27/09/2006 (Average tide), 28/09/2006 (Average tide) & 11/03/2008 (Spring tide)

Measurement Day		16/02/'05	22/03/'06	23/03/'06	27/09/'06	28/09/'06	11/03/'08
Ebb	SS Mass [Tonnes]	13 217	27 455	17 301	9 908	10 542	88 476
	Duration [HH:MM]	6:50	6:20	6:23	6:14	6:12	7:03
	Tidal Difference [m]	4.95	4.68	4.22	5.26	4.94	6.14
Flood	SS Mass [Tonnes]	-7 386	-19 508	-12 653	-9 843	-8 629	-52 743
	Duration [HH:MM]	5:50	6:10	6:12	5:59	5:59	5:46
	Tidal Difference [m]	4.68	4.38	4.06	5.24	5.12	5.85
Net	SS Mass [Tonnes]	5 830	7 947	4 648	64	1 913	35 733
	Duration [HH:MM]	12:40	12:30	12:36	12:14	12:12	12:50

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IMDC (2005k). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 5.1: Overview of ambient conditions in the river Scheldt January-June 2005, I/RA/11265/05.018/MSA.

IMDC (2005l). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 5.2: Overview of ambient conditions in the river Scheldt July-December 2005, I/RA/11265/05.019/MSA.

IMDC (2006a) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 6.1 Calibration Winter 15 March & 14 April 2006? I/RA/11291/06.092/MSA.

IMDC (2006b) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 7.1 21 March 2006 Scheldewacht – Deurganckdok, I/RA/11291/06.094/MSA.

IMDC (2006c) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 7.2 22 March 2006 Parel 2 – Deurganckdok (downstream), I/RA/11291/06.095/MSA.

IMDC (2006d) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 7.3 22 March 2006 Laure Marie – Liefkenshoek, I/RA/11291/06.096/MSA.

IMDC (2006e) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 7.4 23 March 2006 Parel 2 – Schelle, I/RA/11291/06.097/MSA.

IMDC (2006f) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 7.5 23 March 2006 Laure Marie – Deurganckdok (downstream), I/RA/11291/06.098/MSA.

IMDC (2006g) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 7.6 23 March 2006 Veremans – Waarde, I/RA/11291/06.099/MSA.

IMDC (2006h) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.1 Opmeting stroming en zout- en sedimentbeweging aan de ingang van het Deurganckdok (SiltProfiler), I/RA/11283/06.087/WGO.

IMDC (2006i) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.3. Opmeting stroming en zout-en sedimentbeweging aan de ingang van het Deurganckdok (ADCP), I/RA/11283/06.110/BDC

IMDC (2006j). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 8.1: Vaste meetopstelling in zake bodemgedrag, I/RA/11291/06.100/MSA.

IMDC (2006k) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.6 Zout en slibverdeling Deurganckdok 17/03/2006 – 23/05/2006, I/RA/11283/06.121/MSA.

IMDC (2006l) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 5.3 Overview of ambient conditions in the river Scheldt – Januari-June 2006 (I/RA/11291/06.089/MSA), in opdracht van AWZ.

IMDC (2006m): Studie van de stromingsvelden en sedimentuitwisseling aan de ingang van Deurganckdok. Current and Sediment flux measurements November 17th 2005 (I/RA/15030/06.021/BDC).

IMDC (2006n). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 9: Valsnelheid slib – INSSEV, I/RA/11291/06.102/MSA, in opdracht van AWZ.

IMDC (2006o). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 2.7: Silt distribution and frame measurements 15/07/2006 – 31/10/2006. (I/RA/11291/06.122/MSA).

IMDC (2006p) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 5.3 Overview of ambient conditions in the river Scheldt – Januari-June 2006 (I/RA/11291/06.089/MSA), in opdracht van AWZ.

IMDC (2007a) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 6.2 Summer calibration and Final report, I/RA/11291/06.093/MSA.

IMDC (2007b). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 5.4 Overview of ambient conditions in the river Scheldt – July-December 2006 (I/RA/11291/06.089/MSA), in opdracht van AWZ.

IMDC (2007c). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 11.1 Through tide Measurement Sediview & Siltprofiler 27/9 Stream - Liefkenshoek (I/RA/11291/06.104/MSA), in opdracht van AWZ.

IMDC (2007d). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 11.2 Through tide Measurement Sediview 27/9 Veremans - Raai K (I/RA/11291/06.105/MSA), in opdracht van AWZ.

IMDC (2007e). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 11.3 Through tide Measurement Sediview & Siltprofiler 28/9 Stream - Raai K (I/RA/11291/06.106/MSA), in opdracht van AWZ.

IMDC (2007f). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 11.4 Through tide Measurement Sediview 28/9 Veremans - Waarde(I/RA/11291/06.107/MSA), in opdracht van AWZ.

IMDC (2007g). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 11.5 Through tide Measurement Sediview 28/9 Parel 2 - Schelle (I/RA/11291/06.108/MSA), in opdracht van AWZ.

IMDC (2007h). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 11.6 Through tide Measurement Salinity Distribution 26/9 Scheldewacht – Deurganckdok in opdracht van AWZ.

IMDC (2007i) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.1 Sediment Balance: Three monthly report 1/4/2006 – 30/06/2006 (I/RA/11283/06.113/MSA)

IMDC (2007j) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.2 Sediment Balance: Three monthly report 1/7/2006 – 30/09/2006 (I/RA/11283/06.114/MSA)

IMDC (2007k) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.3 Sediment Balance: Three monthly report 1/10/2006 – 31/12/2006 (I/RA/11283/06.115/MSA)

IMDC (2007l) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.4 Sediment Balance: Three monthly report 1/1/2007 – 31/03/2007 (I/RA/11283/06.116/MSA)

IMDC (2007m) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.5 Annual Sediment Balance (I/RA/11283/06.117/MSA)

IMDC (2007n) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.2 Through tide measurement SiltProfiler 26/09/2006 Stream (I/RA/11283/06.068/MSA)

IMDC (2007o) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.7 Salt-Silt distribution & Frame Measurements Deurganckdok 15/07/2006 – 31/10/2006 (I/RA/11283/06.122/MSA)

IMDC (2007p) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.8 Salt-Silt distribution & Frame Measurements Deurganckdok 15/01/2007 – 15/03/2007 (I/RA/11283/06.123/MSA)

IMDC (2007q) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 3.1 Boundary conditions: Three monthly report 1/1/2007 – 31/03/2007 (I/RA/11283/06.127/MSA)

IMDC (2007r) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing Deelrapport 1.10: Sediment Balance: Three monthly report 1/4/2007 – 30/06/2007 (I/RA/11283/07.081/MSA)

IMDC (2007s) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.11: Sediment Balance: Three monthly report 1/7/2007 – 30/09/2007 (I/RA/11283/07.082/MSA)

IMDC (2007t) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.16: Salt-Silt distribution Deurganckdok summer (21/6/2007 – 30/07/2007) (I/RA/11283/07.092/MSA)

IMDC (2007v) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 3.10: Boundary conditions: Three monthly report 1/04/2007 – 30/06/2007 (I/RA/11283/07.097/MSA)

IMDC (2007w) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 3.11: Boundary conditions: Two monthly report 1/07/2007 – 30/09/2007 (I/RA/11283/07.098/MSA)

IMDC (2008a) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.5: Through tide measurement Sediview average tide 24/10/2007 (I/RA/11283/06.120/MSA)

IMDC (2008b) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 4.1: Analysis of siltation Processes and Factors (I/RA/11283/06.129/MSA)

IMDC (2008c) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.12: Sediment Balance: Four monthly report 1/9/2007 – 31/12/2007 (I/RA/11283/07.083/MSA)

IMDC (2008d) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.13: Sediment Balance: Four monthly report 1/01/2007 – 31/03/2007 (I/RA/11283/07.084/MSA)

IMDC (2008e) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.14: Annual Sediment Balance. (I/RA/11283/07.085/MSA)

IMDC (2008f) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.09: Calibration stationary equipment autumn (I/RA/11283/07.095/MSA)

IMDC (2008g) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.10: Through tide measurement SiltProfiler 23 October 2007 (I/RA/11283/07.086/MSA)

IMDC (2008h) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.11: Through tide measurement Salinity Profiling winter 12 March 2008 (I/RA/11283/07.087/MSA)

IMDC (2008i) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.12: Through tide measurement Sediview winter 11 March 2008 – Transect I (I/RA/11283/07.088/MSA)

IMDC (2008j) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.13: Through tide measurement Sediview winter 11 March 2008 – Transect K (I/RA/11283/07.089/MSA)

IMDC (2008k) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.14: Through tide measurement Sediview winter 11 March 2008 – Transect DGD (I/RA/11283/07.090/MSA)

IMDC (2008l) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.15: Through tide measurement SiltProfiler winter 12 March 2008 (I/RA/11283/07.091/MSA)

IMDC (2008m) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.17: Salt-Silt distribution & Frame Measurements Deurganckdok autumn (17/9/2007-10/12/2007) (I/RA/11283/07.093/MSA)

IMDC (2008n) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.18: Salt-Silt distribution & Frame Measurements Deurganckdok winter (18/02/2007-31/03/2008) (I/RA/11283/07.094/MSA)

IMDC (2008o) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.19: Calibration stationary & mobile equipment winter (I/RA/11283/07.096/MSA)

IMDC (2008p) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 3.12: Boundary conditions: Three monthly report 1/9/2007 – 31/12/2007 (I/RA/11283/07.099/MSA)

IMDC (2008q) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 3.13: Boundary conditions: Three monthly report 1/1/2008 – 31/3/2007 (I/RA/11283/07.100/MSA)

IMDC (2008r) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 3.14: Boundary conditions: Annual report (I/RA/11283/07.101/MSA)

IMDC (2008s) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 4.10: Analysis of siltation Processes and Factors (I/RA/11283/07.102/MSA)

TV SAM (2006a) Langdurige stationaire ADCP stroommetingen te Oosterweel dukdalf 01/2005-06/2005. 42SR S032PIB 2A.

TV SAM (2006b) Langdurige stationaire ADCP stroommetingen te Oosterweel dukdalf 07/2005-12/2005. 42SR S033PIB 2A.

TV SAM (2006c) Langdurige stationaire ADCP stroommetingen te Oosterweel dukdalf 01/2006-06/2006. 42SR S032PIB 2A.

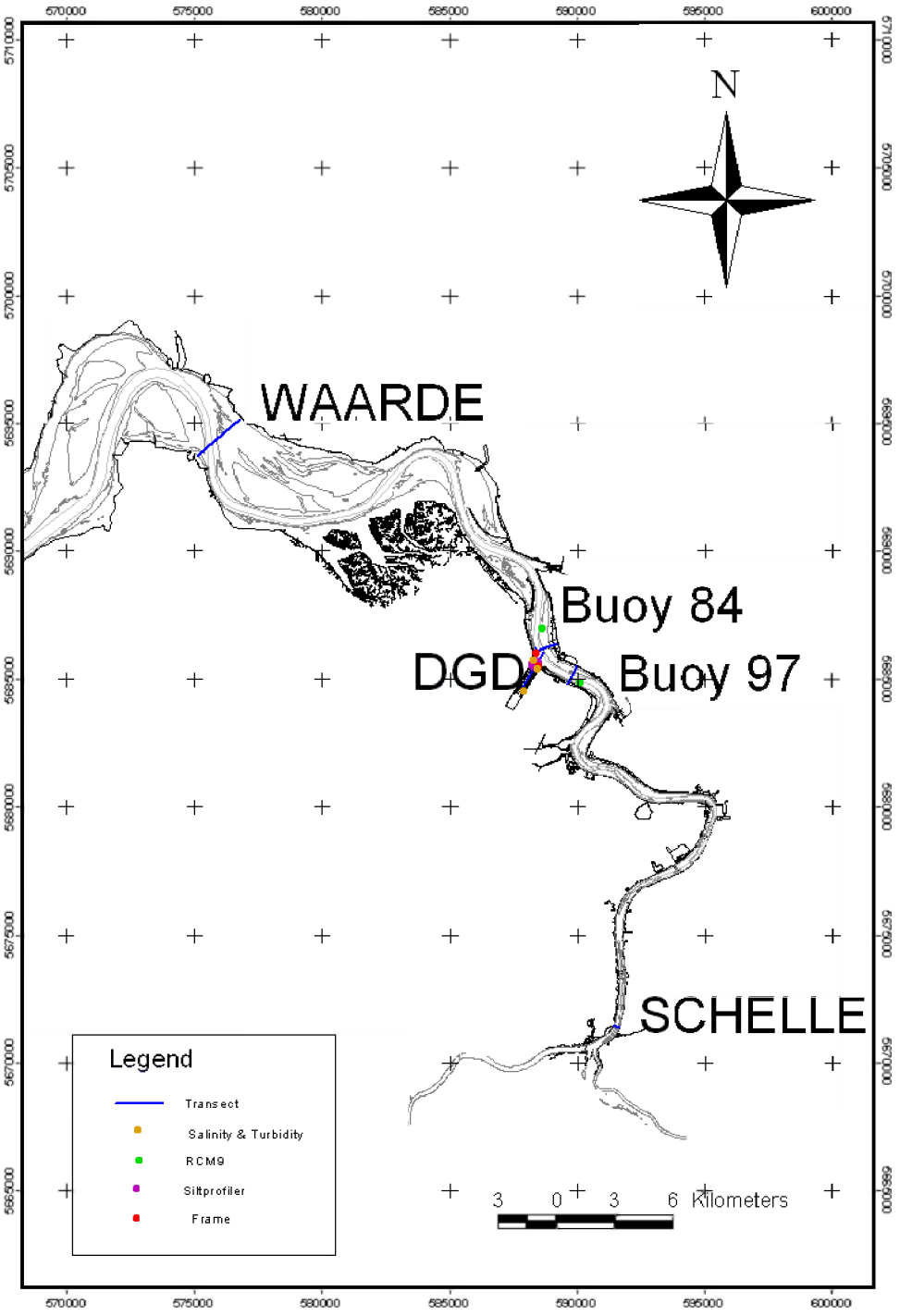
Unesco (1983). Algorithms for computation of fundamental properties of seawater, UNESCO Technical Papers in Marine Science, 44. UNESCO, France.

Wunderground (2008). Weather Underground: www.wunderground.com

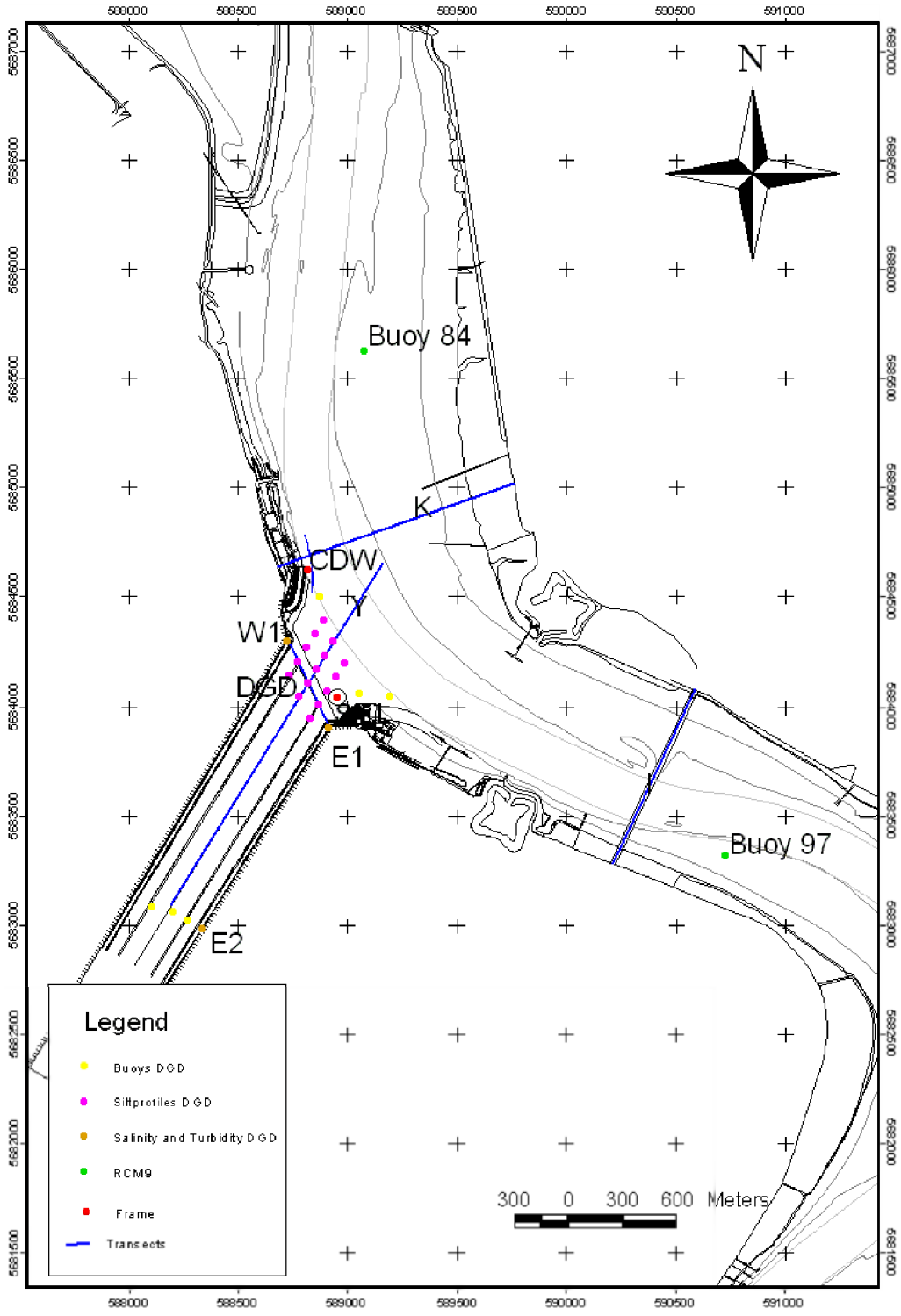
APPENDIX A.

OVERVIEW OF MEASUREMENTS

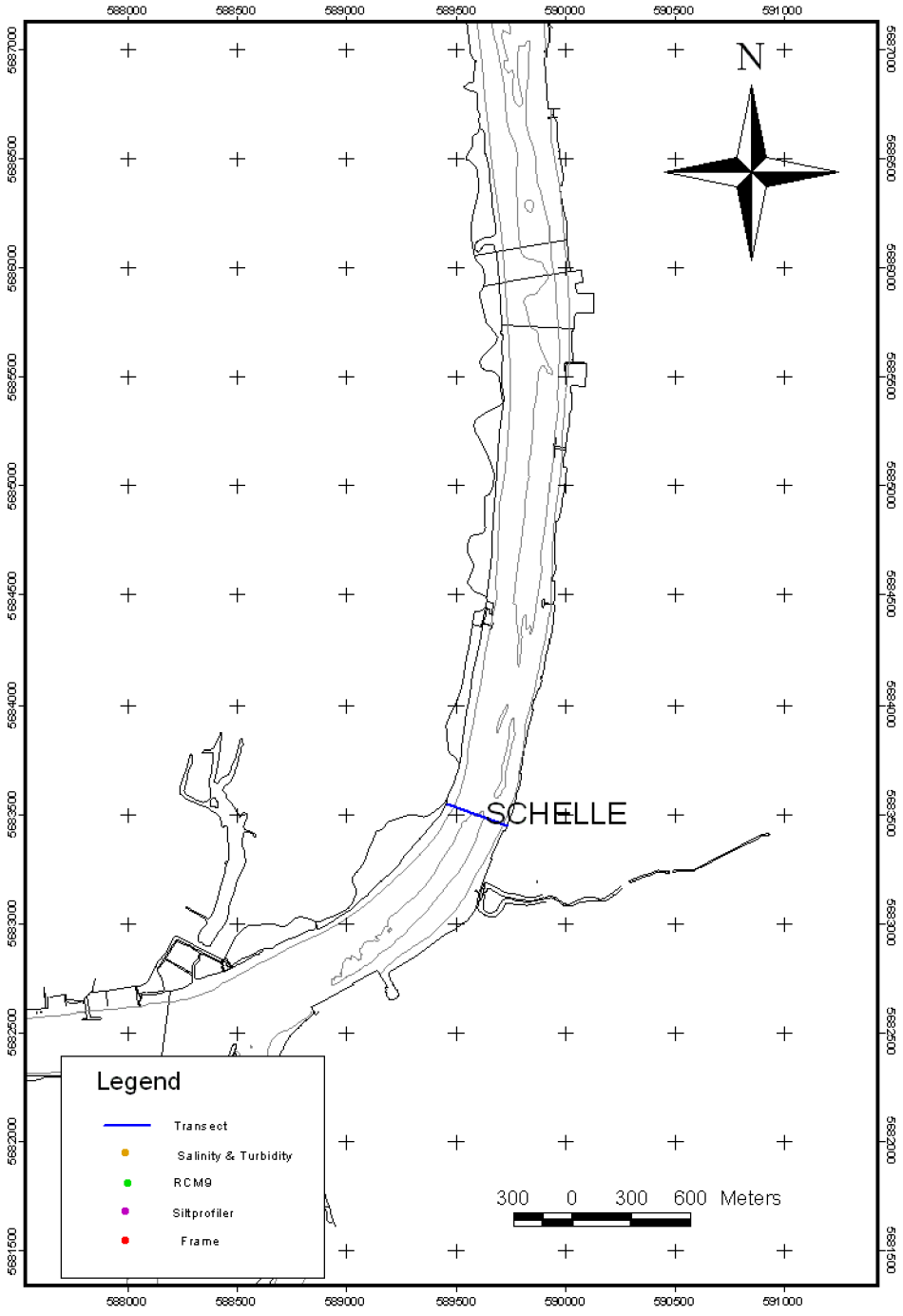
A.1 Overview of the measurement locations for the whole HCBS2 and Deurganckdok measurement campaigns



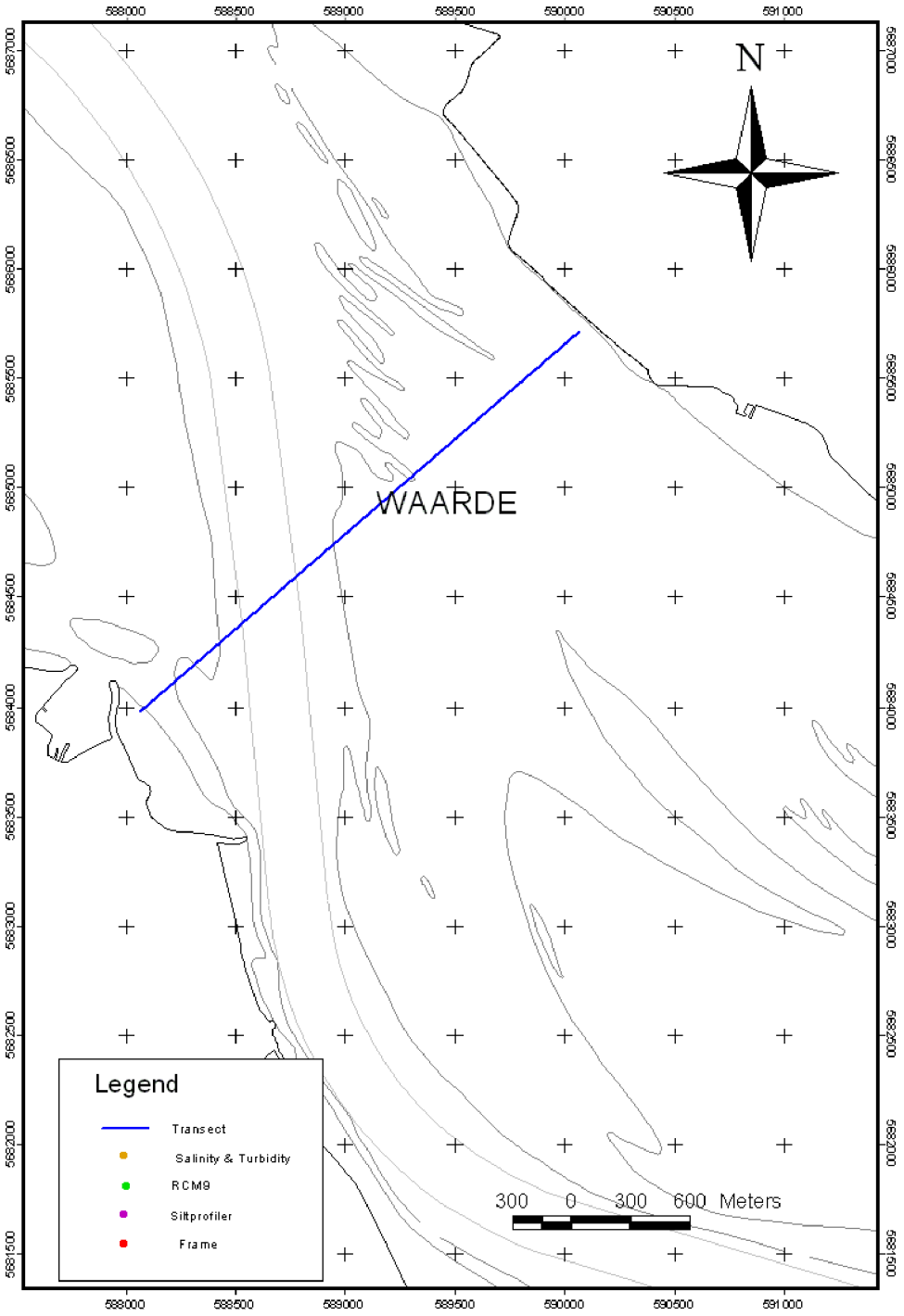
Annex Figure A-1: Overview of the measurement locations



Annex Figure A-2: Overview of the measurement locations at Deurganckdok



Annex Figure A-3: Transect S in Schelle



Annex Figure A-4: Transect W in Waarde

A.2 Overview of all measurement locations HCBS and Deurganckdok measurement campaigns

Annex Table A-1: coordinates of theoretical transects

Transect	Start Easting	Start Northing	End Easting	End Northing
I	590318.00	5683302.00	590771.00	5684257.00
K	588484.00	5684924.00	589775.00	5685384.00
SCHELLE	592645.07	5665794.06	592952.68	5665682.28
DGD	588764.88	5684056.49	588540.95	5684526.94
Y	589059.09	5684948.36	587898.76	5683076.56
WAARDE	573541.00	5696848.20	571318.00	5694932.90

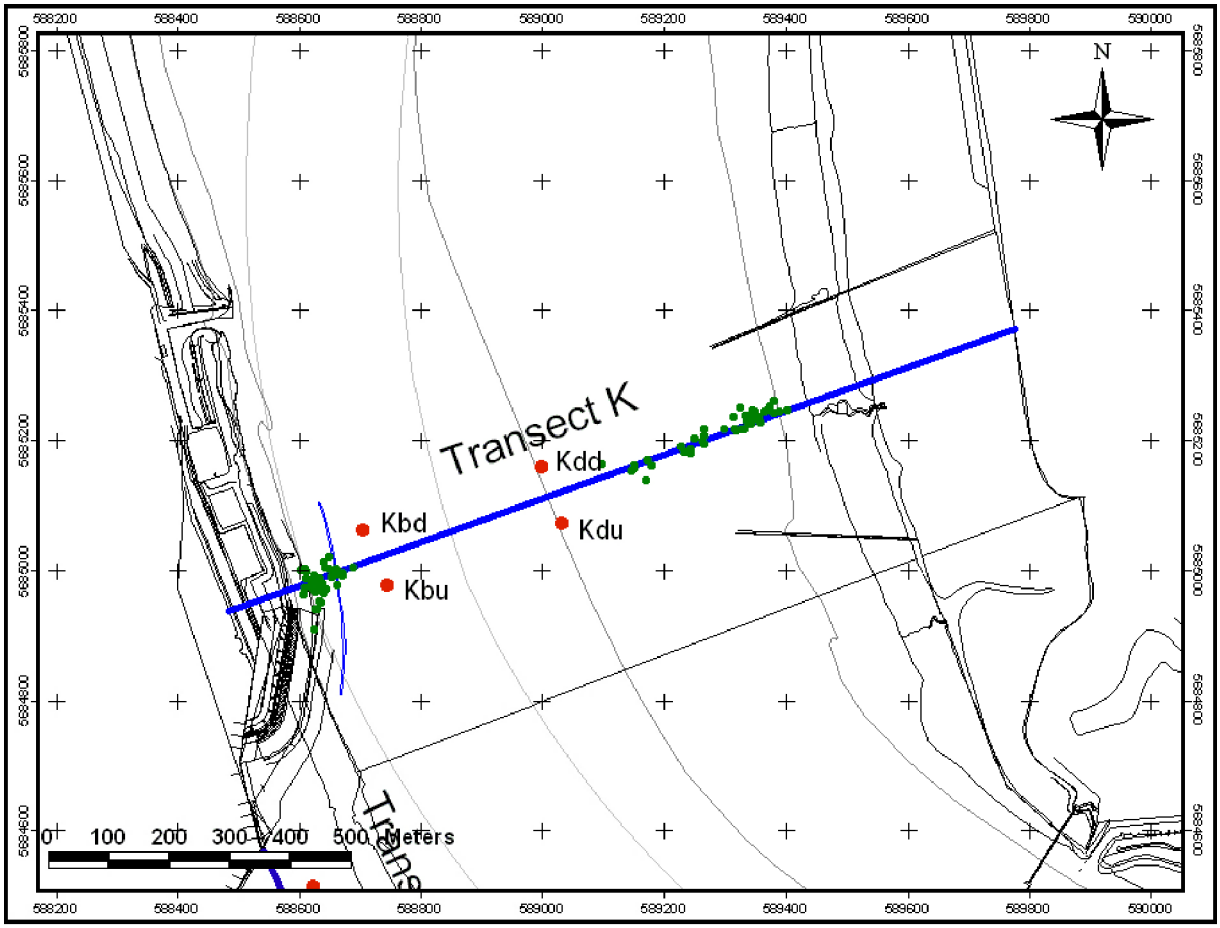
Annex Table A-2: coordinates of SiltProfiler gauging locations

SP	EASTING	NORTHING
1	588737	5684638
2	588690	5684562
3	588643	5684486
4	588596	5684411
5	588549	5684335
6	588606	5684217
7	588653	5684293
8	588700	5684368
9	588747	5684444
10	588793	5684520
11	588850	5684402
12	588803	5684326
13	588756	5684250
14	588709	5684174
15	588662	5684099

A.3 Measurement overview at Transect K on 11/03/2008

FileName	Start time [hh:mm MET	End time [hh:mm MET]	Time after HW [hh:mm]	Easting Start (UTM31 ED50)	Northing Start (UTM31 ED50)	Easting Stop (UTM31 ED50)	Northing Stop (UTM31 ED50)	Transect length [m]	Transect heading [°]
3002Ktrl	7:07	7:13	2:10	590686	5684129	590360	5683500	835	22
3004Klr	7:32	7:37	2:34	590408	5683744	590454	5683872	778	21
3006Ktrl	7:48	7:54	2:51	590669	5684127	590384	5683489	813	21
3008Ktlr	8:04	8:08	3:06	590415	5683628	590464	5683878	737	20
3010Ktrl	8:21	8:27	3:24	590615	5684033	590357	5683490	777	22
3012Ktlr	8:41	8:44	3:43	590375	5683687	590451	5683872	738	21
3014Ktrl	9:02	9:07	4:05	590668	5684131	590374	5683479	762	22
3016Ktlr	9:20	9:24	4:22	590377	5683485	590657	5684114	709	20
3017Ktrl	9:49	9:54	4:52	590664	5684101	590423	5683505	666	21
3019Ktlr	10:10	10:14	5:12	590395	5683924	590424	5683607	701	19
3021Ktrl	10:26	10:30	5:28	590450	5683515	590676	5684112	672	21
3023Ktlr	10:47	10:50	5:49	590676	5684096	590370	5683504	642	20
3025Ktrl	11:00	11:05	6:02	590412	5683486	590631	5684079	675	21
3027Ktlr	11:19	11:23	6:21	590472	5683698	590376	5683520	625	18
3029Ktrl	11:35	11:37	6:35	590402	5683520	590629	5684075	682	20
3031Ktlr	11:49	11:52	6:51	590645	5684061	590364	5683516	602	19
3033Ktrl	12:05	12:10	7:08	590393	5683518	590636	5684068	580	20
3035Ktlr	12:19	12:22	7:21	590630	5684057	590363	5683541	536	18
3037Ktrl	12:42	12:45	-5:06	590464	5683666	590515	5683844	514	22
3039Ktlr	12:57	13:00	-4:51	590613	5684051	590387	5683547	506	20
3041Ktrl	13:14	13:18	-4:33	590416	5683530	590613	5684035	561	23
3043Ktlr	13:26	13:29	-4:22	590641	5684016	590400	5683531	556	19
3045Ktrl	13:38	13:42	-4:09	590378	5683527	590640	5684054	551	21
3047Ktlr	13:59	14:03	-3:48	590630	5684022	590412	5683523	666	23
3049Ktrl	14:25	14:31	-3:21	590395	5683558	590652	5684062	725	21
3051Ktlr	14:42	14:47	-3:04	590667	5684054	590392	5683519	749	22
3053Ktrl	14:57	15:01	-2:50	590433	5683674	590633	5683809	727	23
3055Ktlr	15:15	15:19	-2:32	590658	5684057	590405	5683498	774	23
3057Ktrl	15:34	15:38	-2:13	590493	5683646	590610	5683833	642	21
3059Ktlr	15:54	15:58	-1:53	590672	5684079	590371	5683504	747	23
3061Ktrl	16:09	16:15	-1:37	590440	5683670	590617	5683854	748	18
3063Ktlr	16:32	16:38	-1:14	590636	5684082	590384	5683504	832	25
3065Ktrl	16:55	17:00	-0:51	590393	5683494	590645	5684077	779	18
3067Ktlr	17:14	17:19	-0:33	590723	5684057	590413	5683492	822	19
3069Ktrl	17:29	17:34	-0:18	590461	5683651	590558	5683810	767	20
3071Ktlr	17:48	17:52	0:00	590662	5684096	590397	5683529	788	18
3073Ktrl	18:06	18:11	0:18	590409	5683535	590702	5684114	724	17
3075Ktlr	18:22	18:26	0:34	590723	5684094	590432	5683526	732	21
3077Ktrl	18:46	18:51	0:58	590425	5683512	590742	5684128	769	20
3079Ktlr	19:03	19:07	1:15	590671	5684088	590382	5683507	728	20

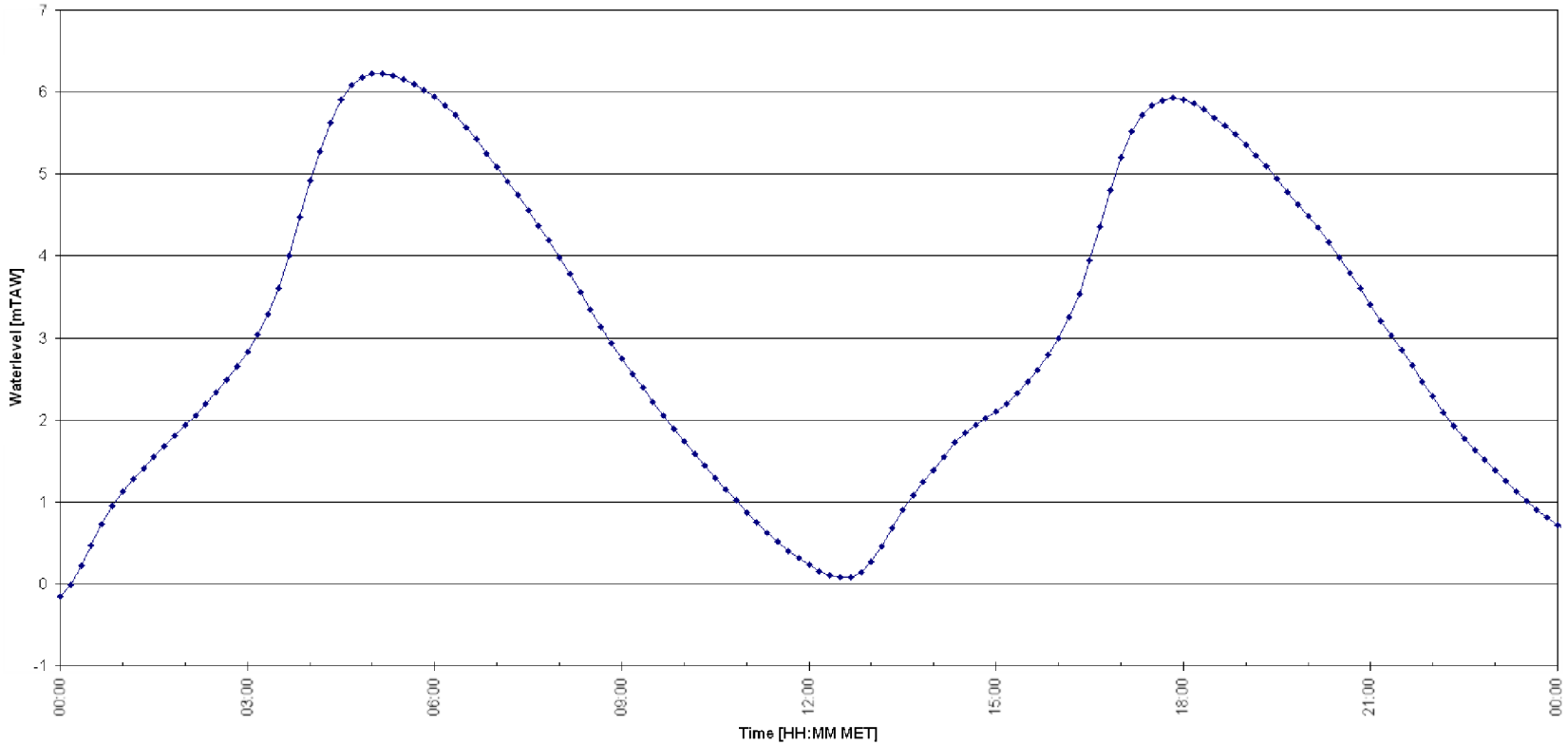
FileName	Start time [hh:mm MET	End time [hh:mm MET]	Time after HW [hh:mm]	Easting Start (UTM31 ED50)	Northing Start (UTM31 ED50)	Easting Stop (UTM31 ED50)	Northing Stop (UTM31 ED50)	Transect length [m]	Transect heading [°]
3081Ktrl	19:19	19:24	1:31	590707	5683682	590565	5683839	782	20
3083Ktlr	19:37	19:41	1:49	590676	5684140	590405	5683549	707	22



Annex Figure A-5: Location of start en end points of the sailed tracks

APPENDIX B. TIDAL DATA

11283 – March 2008 SURVEY



Measured tide on 11/03/2008 at Liefkenshoek

Location:	Date:
River Scheldt	11/03/2008

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/07.089/MSA

APPENDIX C.

NAVIGATION INFORMATION AS RECORDED ON SITE

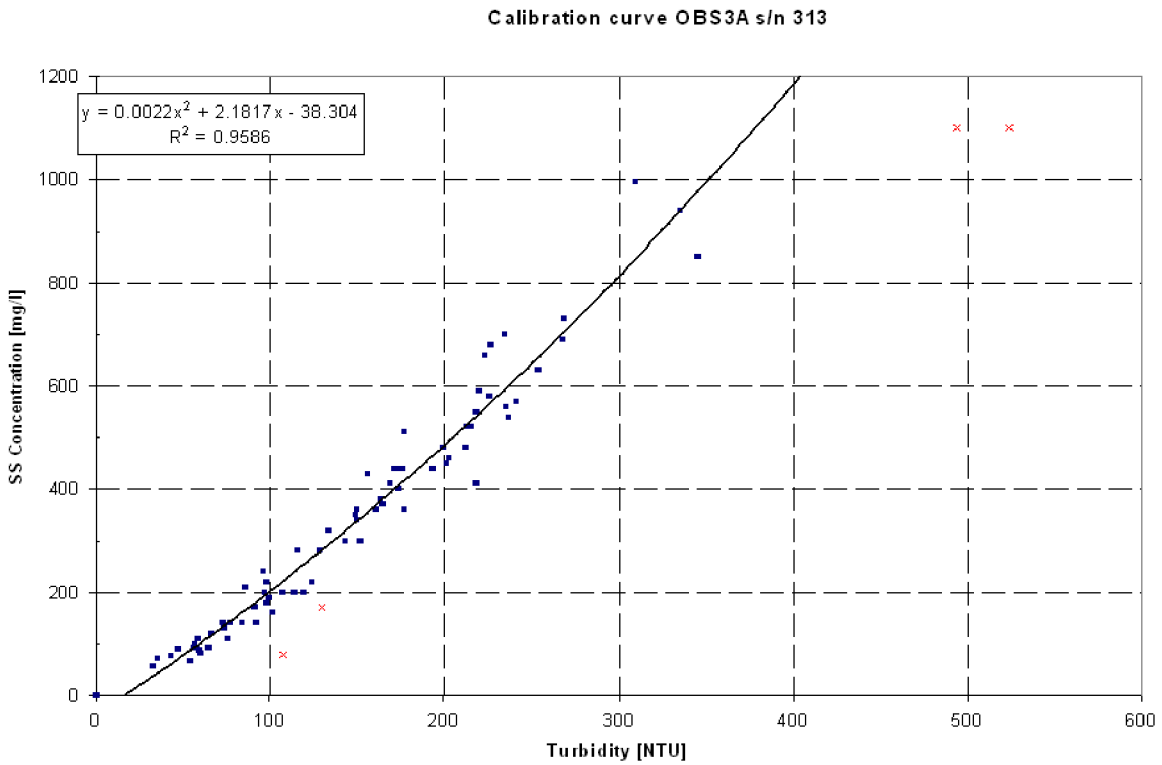
Ship:		*Scheldewacht II*	
Location:		*Liefkenshoek (transect K)*	
Nr.	***Time (MET)***	***Type ship***	***Direction (Upstream, Downstream)***
1	6:50	Sleepboot	Upstream
2	7:03	Binnenschip	Downstream
3	7:04	Binnenschip	Downstream
4	7:28	Binnenschip	Upstream
5	7:29	Binnenschip	Upstream
6	7:30	Binnenschip	Upstream
7	7:35	Binnenschip	Upstream
8	7:37	Binnenschip	Downstream
9	7:40	Binnenschip	Downstream
10	7:45	Zeeboot	Downstream
11	7:52	Binnenschip	Upstream
12	7:54	Binnenschip	Downstream
13	8:06	Sleepboot	Upstream
14	8:35	Duwbak	Upstream
15	8:38	Binnenschip	Upstream
16	8:46	Baggerboot	Upstream
17	9:02	Binnenschip	Downstream
18	9:12	Zeebootje	Upstream
19	9:40	Zeeboot	Upstream
20	9:41	Binnenschip	Upstream
21	10:47	Binnenschip	Upstream
22	10:48	Zeeschip	Upstream
23	11:00	Zeeboot	Upstream
24	11:01	Sleepboot	Upstream
25	11:03	Binnenschip	Downstream
26	11:03	Sleepboot	Upstream
27	11:10	3 Binnenschepen	Downstream
28	11:17	Zeeboot	Downstream
29	11:29	Binnenschip	Upstream
30	11:47	Toeristenboot	Downstream
31	11:48	Binnenschip	Downstream

Ship:		*Scheldewacht II*	
Location:		*Liefkenshoek (transect K)*	
Nr.	***Time (MET)***	***Type ship***	***Direction (Upstream, Downstream)***
32	11:55	Binnenschip	Downstream
33	11:59	Binnenschip	Downstream
34	12:05	Binnenschip	Upstream
35	12:13	Binnenschip	Upstream
36	12:27	Binnenschip	Downstream
37	12:34	Binnenschip	Downstream
38	12:34	Zeeschip	Downstream
39	12:35	Duwbak	Upstream
40	12:38	Binnenschip	Upstream
41	12:42	Binnenschip	Upstream
42	12:42	Binnenschip	Downstream
43	12:47	Binnenschip	Upstream
44	13:13	3x Binnenschip	Downstream
45	13:15	2x Binnenschip	Upstream
46	13:17	1x Binnenschip	Upstream
47	13:40	Binnenschip	Downstream
48	13:40	Binnenschip	Upstream
49	13:44	Binnenschip	Upstream
50	13:50	Binnenschip	Downstream
51	13:50	Binnenschip	Upstream
52	14:20	3x Binnenschip	Downstream
53	14:25	2x Binnenschip	Upstream
54	14:30	1x Binnenschip	Downstream
55	14:35	Zeeschip	Downstream
56	14:35	Binnenschip	Downstream
57	15:04	Binnenschip	Upstream
58	15:38	Binnenschip	Upstream
59	15:45	Gastanker	Upstream
60	15:50	Duw eenheid	Downstream
61	16:08	Zeeboot	Downstream
62	16:18	Binnenschip	Upstream
63	16:30	Sleper	Upstream
64	16:32	Binnenschip	Downstream

Ship:		***Scheldewacht II***	
Location:		***Liefkenshoek (transect K)***	
Nr.	***Time (MET)***	***Type ship***	***Direction (Upstream, Downstream)***
65	16:50	Sleepboot	Downstream
66	16:51	Zeeschip	Downstream
67	16:52	Binnenschip	Upstream
68	16:55	Zeeschip	Downstream
69	16:56	Zeeschip	Upstream
70	16:59	2x Binnenschip	Downstream
71	17:05	Zeeboot	Downstream
72	17:06	Binnenschip	Downstream
73	17:13	Sleepboot	Upstream
74	17:14	Binnenschip	Upstream
75	17:34	Sleep-+zeeboot	Upstream
76	17:35	Zeeschip	Upstream
77	17:47	Zeeschip	Downstream
78	18:10	Binnenschip	Upstream
79	18:15	Binnenschip	Upstream
80	18:24	Zeeboot	Upstream
81	18:34	2 Binnenschepen	Downstream
82	18:36	1 Zeeschip	Downstream
83	19:04	Binnenschip	Downstream
84	19:10	Binnenschip	Downstream
85	19:28	Binnenschip	Upstream

APPENDIX D. CALIBRATION GRAPH OF OBS3A TURBIDITY SENSOR

11283 – March 2008 SURVEY



Calibration Graph of OBS3A s/n 313

Location:	Date:
River Scheldt (Transect K)	11/03/2008

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/07.089/MSA

APPENDIX E.

UNESCO PPS-78 FORMULA FOR CALCULATING SALINITY

Practical Salinity Scale (PPS 78) Salinity in the range of 2 to 42

Constants from the 19th Edition of Standard Methods

R cond.ratio	0.0117	$R = \frac{C}{42.914 mS/cm}$	
C Cond at t	**0.5**		**Input conductivity in mS/cm of sample**
t deg. C	**22.00**		**Input temperature of sample solution**
P dBar	**20**		**Input pressure at which sample is measured in decibars**
Rp	1.0020845	$R_p = 1 + \frac{p(e_1 + e_2 p + e_3 p^2)}{1 + d_1 t + d_2 t^2 + (d_3 + d_4 t)R}$	
rt	1.1641102	$r_t = c_0 + c_1 t + c_2 t^2 + c_3 t^3 + c_4 t^4$	
Rt	0.0099879	$R_t = \frac{R}{R_p \times r_t}$	
Delta S	-0.0010	$\text{Delta S} = \frac{(t-15)}{1+k(t-15)}(b_0 + b_1 R_t^{1/2} + b_2 R_t + b_3 R_t^{3/2} + b_4 R_t^2 + b_5 R_t^{5/2})$	
S = Salinity	**0.257**	$S = a_0 + a_1 R_t^{1/2} + a_2 R_t + a_3 R_t^{3/2} + a_4 R_t^2 + a_5 R_t^{5/2} + \text{delta S}$	

a0	0.0080	b0	0.0005	c0	0.6766097	d1	3.426E-02	e1	2.070E-04
a1	-0.1692	b1	-0.0056	c1	2.00564E-02	d2	4.464E-04	e2	-6.370E-08
a2	25.3851	b2	-0.0066	c2	1.104259E-04	d3	4.215E-01	e3	3.989E-12
a3	14.0941	b3	-0.0375	c3	-6.9698E-07	d4	-3.107E-03		
a4	-7.0261	b4	0.0636	c4	1.0031E-09				
a5	2.7081	b5	-0.0144						
		k	0.0162						

R = ratio of measured conductivity to the conductivity of the Standard Seawater Solution

Conductivity Ratio R is a function of salinity, temperature, and hydraulic pressure. So that we can factor R into three parts i.e.

R = Rt x Rp x rt

R = C(S,t,p)/C(35,15,0)

C = 42.914 mS/cm at 15 deg C and 0 dbar pressure ie C(35,15,0) where 35 is the salinity

Ocean pressure is usually measured in decibars. 1 dbar = 10^-1 bar = 10^5 dyne/cm^2 = 10^4 Pascal.

APPENDIX F. OVERVIEW OF SEDIVIEW SETTINGS

Ship:		***Veremans***	
Location:		***Liefkenshoek (transect K)***	
Date		***11/03/2008***	
Parameters	***Value***	***Parameters***	***Value***
Inst. Depth (m)	2.0	*Compass offset (°)*	-1.2
Force depth (m)	0	*Beam 3 misalignment (°)*	0
Velocity reference	BT	*Effective particle size (µm)*	20
Speed of sound algorithm	Urick	*Beam1 scale factor*	0.440
Error velocity	YES	*Beam2 scale factor*	0.430
External heading	NO	*Beam3 scale factor*	0.425
External Depth	NO	*Beam4 scale factor*	0.425
SSC factor top (%)	100	*Discharge factor top*	Constant
SSC factor bottom (%)	Variable	*Discharge factor bottom*	Power
Shape factor left bank	0.35	*Shape factor right bank*	0.35

Filename	***Calibration const (Ks)***	***Backscatter coefficient (S)***	***SSC factor bottom (%)***	***Distance to the left bank (m)***	***Distance to the right bank (m)***
3002 Ktrl	49	20.25	110	125.42	411.29
3004 Ktlr	49	20.00	122	160.77	431.79
3006 Ktrl	49	20.00	124	130.71	427.33
3008 Ktlr	49	20.38	117	188.17	445.13
3010 Ktrl	49	20.13	109	142.65	451.24
3012 Ktlr	49	20.00	109	179.1	453.93
3014 Ktrl	49	19.50	106	145.84	463.5
3016 Ktlr	49	19.00	100	187.28	473.89
3017 Krl	49	19.00	107	149.27	555.39
3019 Ktlr	49	19.25	107	190.99	478.47
3021 Ktrl	49	19.00	109	157.5	540.77
3023 Ktlr	49	19.00	109	184.18	544.72
3025 Ktrl	49	19.25	110	160.23	535.65
3027 Ktlr	49	19.38	110	179.45	565.98
3029 Ktrl	49	19.50	118	145.9	542.11
3031 Ktlr	49	19.50	118	189.62	578.69
3033 Ktrl	49	19.50	106	153.37	637.47
3035 Ktlr	49	19.63	106	173.24	661.1
3037 Ktrl	49	20.13	104	146.53	711.05
3039 Ktlr	49	20.75	115	197.31	666.83
3041 Ktrl	49	21.25	116	148.04	662.44
3043 Ktlr	49	21.25	115	164.11	650.41

Filename	*Calibration const (Ks)*	*Backscatter coefficient (S)*	*SSC factor bottom (%)*	*Distance to the left bank (m)*	*Distance to the right bank (m)*
3045 Ktrl	49	21.75	144	183.6	635.57
3047 Ktlr	49	22.38	143	137.01	568.72
3049 Ktrl	49	22.50	214	141.28	504.3
3051 Ktlr	49	22.38	212	158.04	464.29
3053 Ktrl	49	21.88	189	161.53	483.63
3055 Ktlr	49	21.50	181	148.06	449.17
3057 Ktrl	49	21.00	108	148.88	579.96
3059 Ktlr	49	20.13	134	138.48	486.03
3061 Ktrl	49	20.25	131	134.49	488.68
3063 Ktlr	49	20.88	107	124.18	418.1
3065 Ktrl	49	20.75	106	141.77	449.69
3067 Ktlr	49	20.38	104	153.05	395.35
3069 Ktrl	49	19.75	105	158.82	444.89
3071 Ktlr	49	19.25	110	174.34	408.42
3073 Ktrl	49	19.38	141	186.73	460.24
3075 Ktlr	49	20.00	143	217.5	421.1
3077 Ktrl	49	21.00	107	138.29	463.06
3079 Ktlr	49	21.50	119	197.84	444.42
3081 Ktrl	49	21.50	143	142.56	446.11
3083 Ktlr	49	21.50	148	197.57	466.8

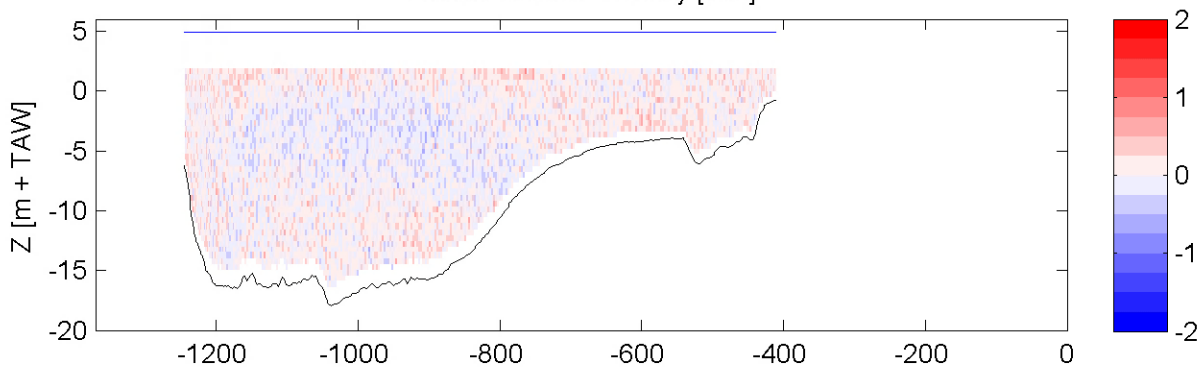
APPENDIX G. CONTOURPLOTS OF FLOW VELOCITIES, SEDIMENT CONCENTRATION AND SEDIMENT FLUX PER SAILED TRANSECT

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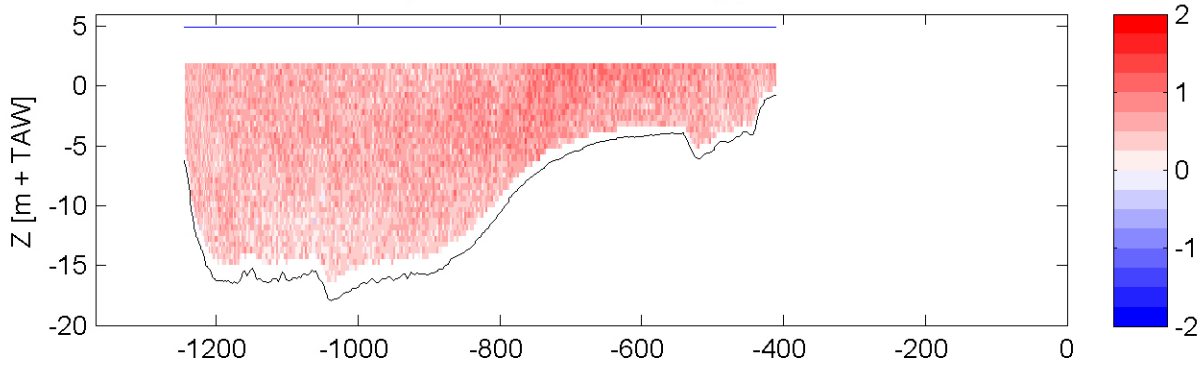
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3002Ktrl_sub.csv	Location: Transect K

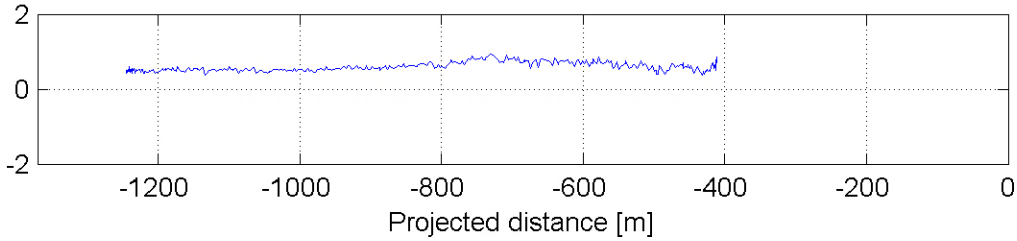
Parallel Current Velocity [m/s]



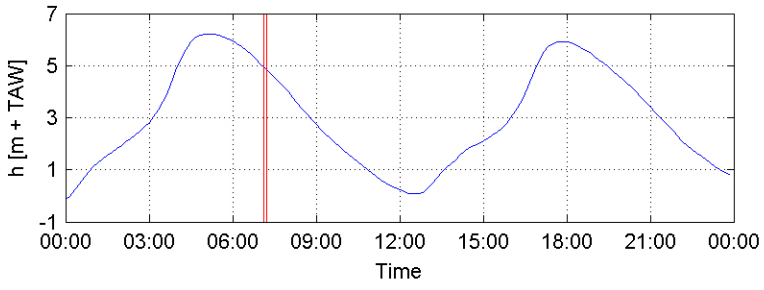
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
07:07 - 07:13

Time after HW [HH:MM]
2:10

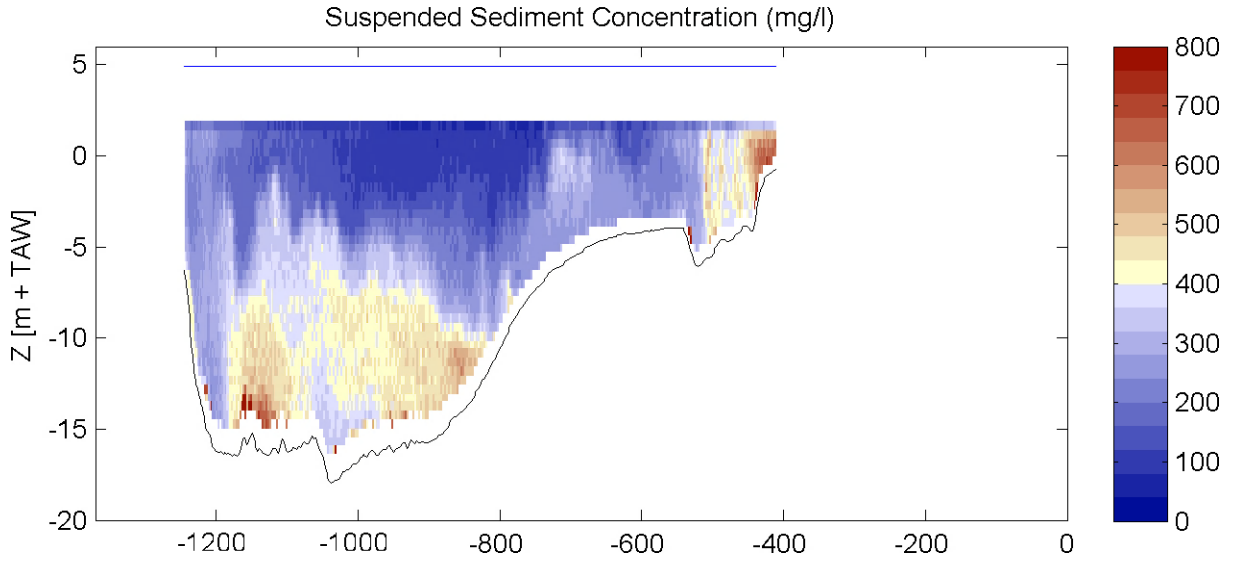
Data Processed by: IMDC

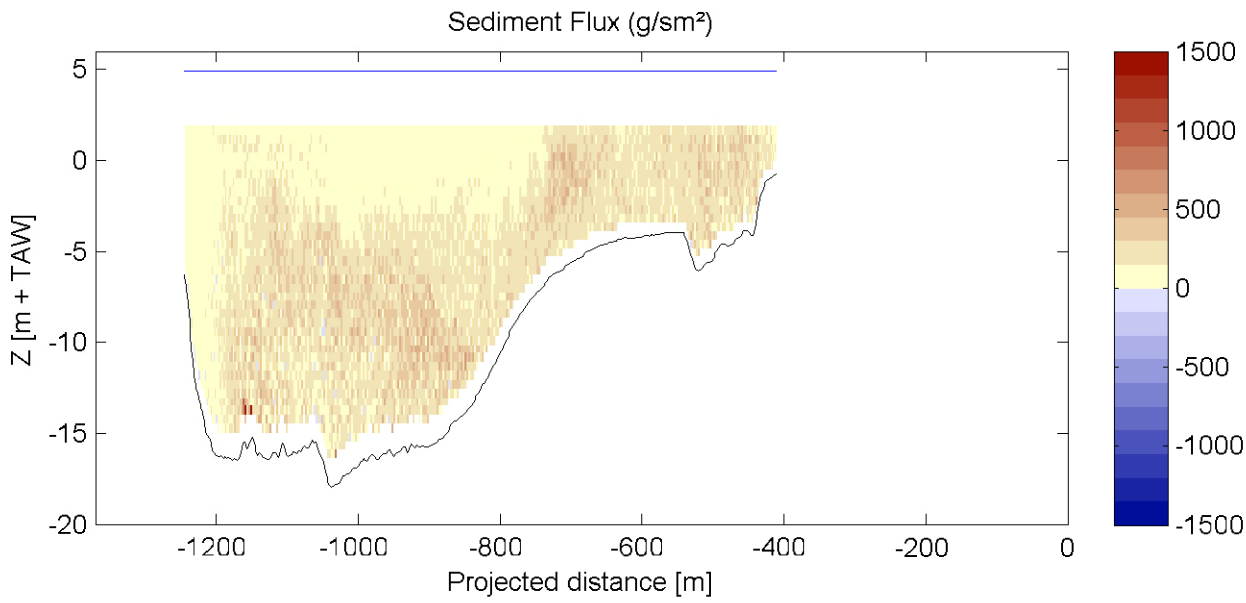
In association with : WL | delft hydraulics, GEMS International

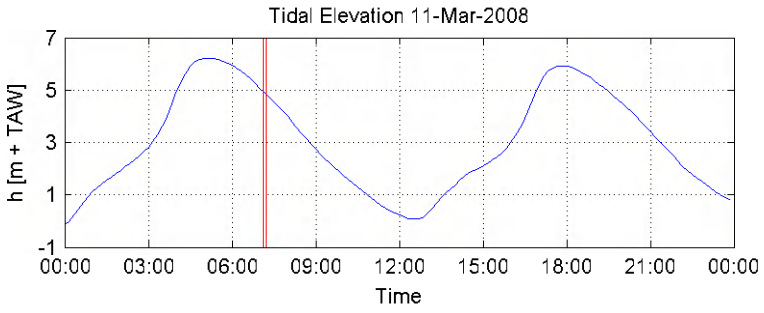
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3002Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

07:07 - 07:13

Time after HW [HH:MM]

2:10

Data Processed by: IMDC

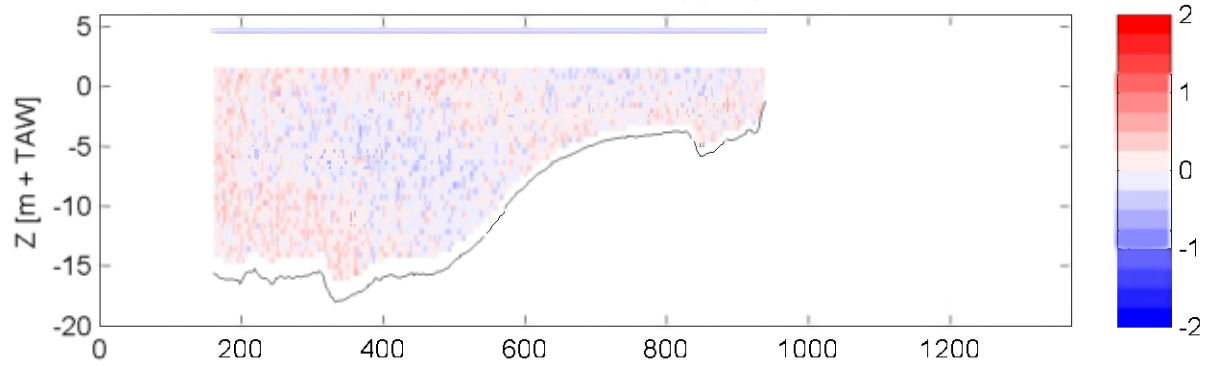
In association with :

I/RA/11283/07.089/MSA

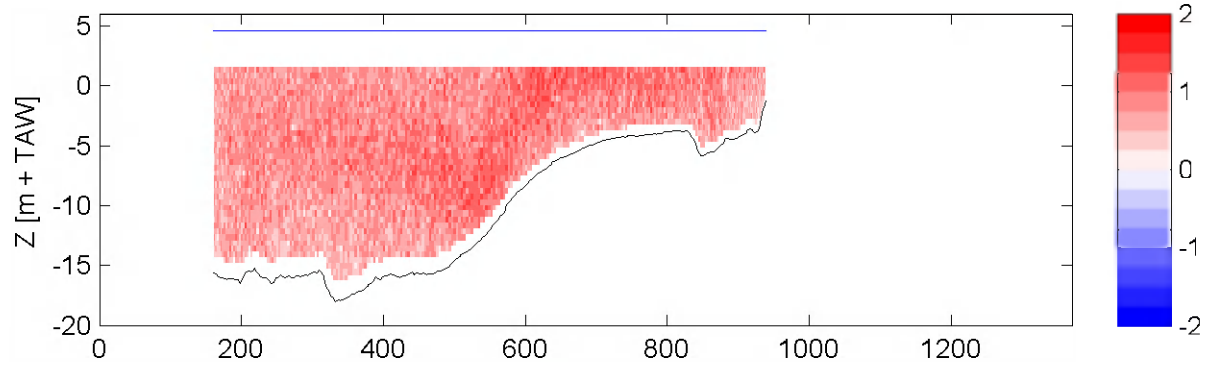
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3004Klr_sub.csv	Location: Transect K

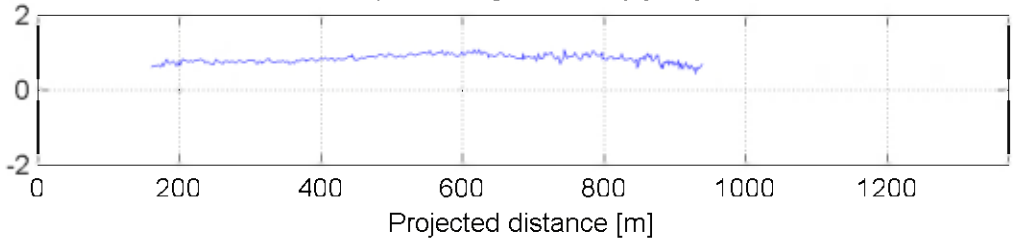
Parallel Current Velocity [m/s]



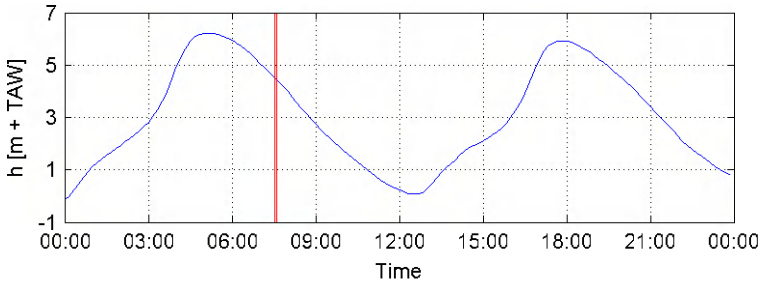
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
07:32 - 07:37

Time after HW [HH:MM]
2:34

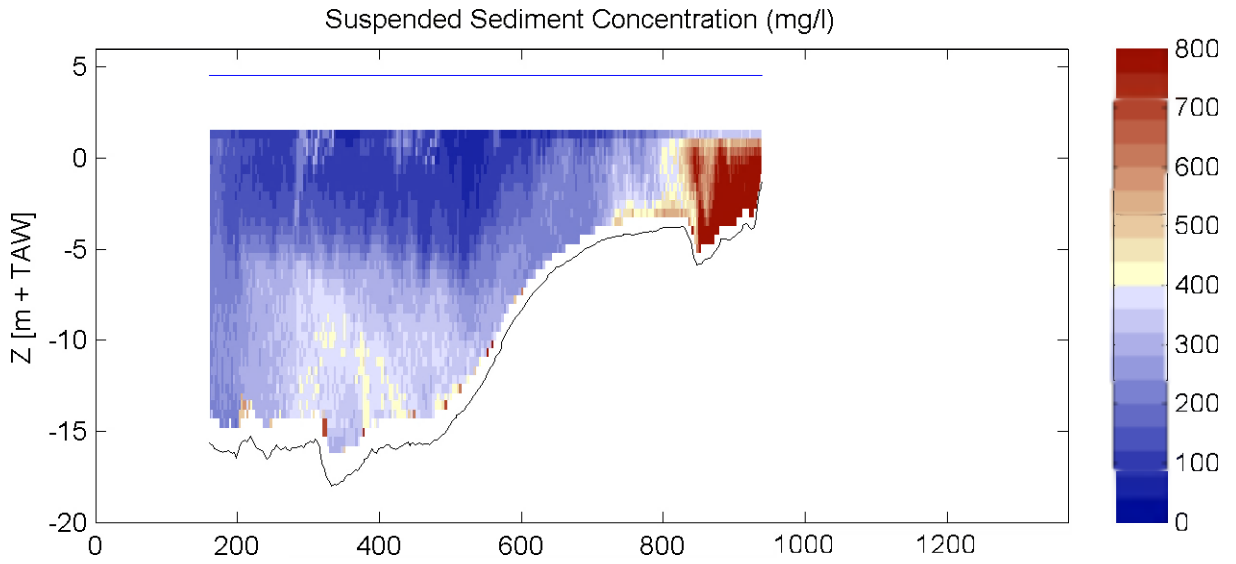
Data Processed by: IMDC

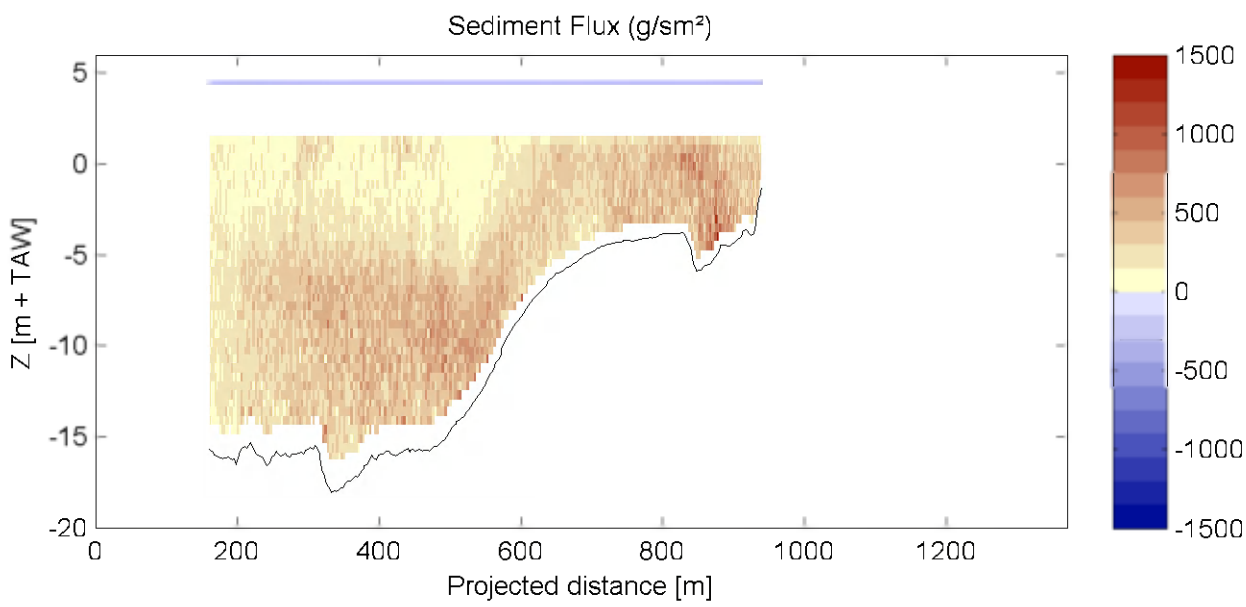
In association with :

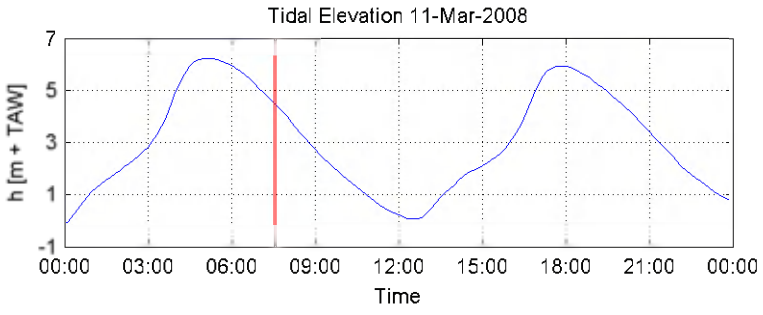
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3004Klr_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

07:32 - 07:37

Time after HW [HH:MM]

2:34

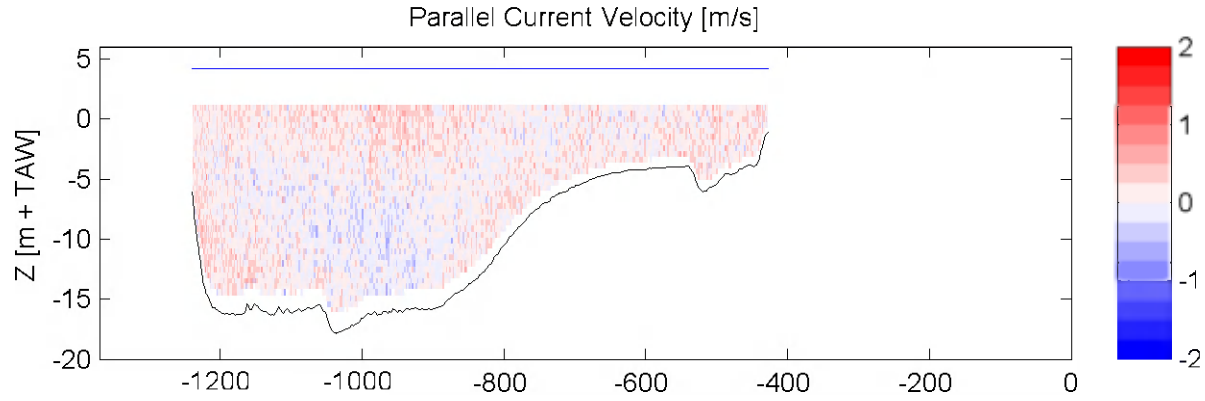
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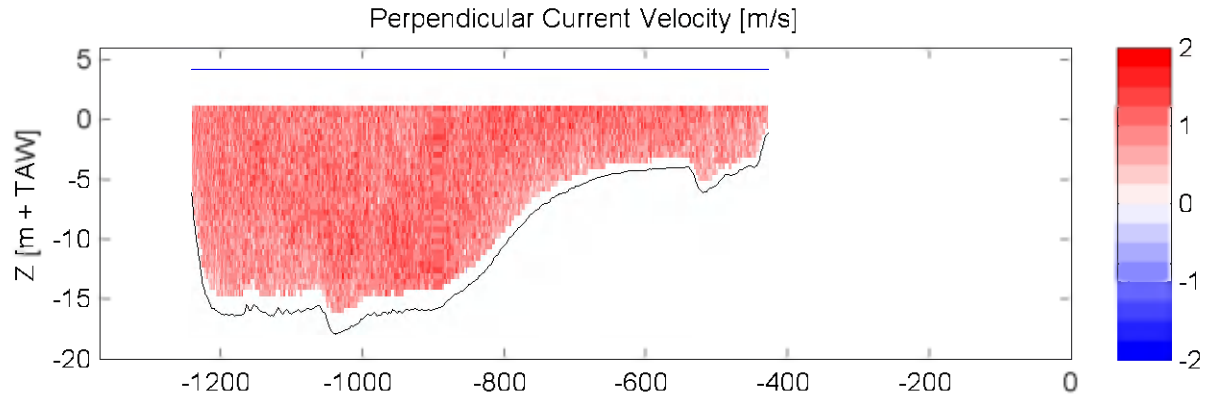
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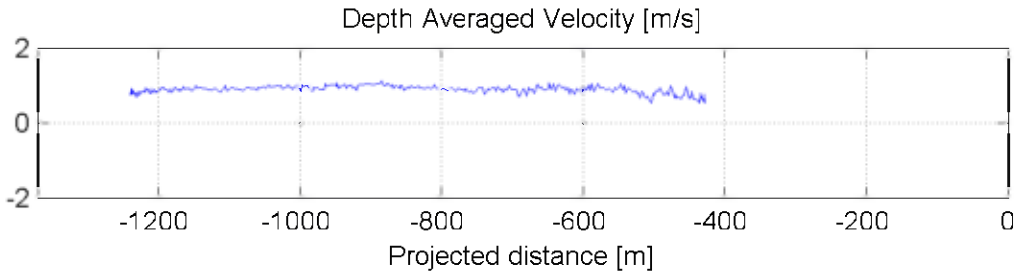
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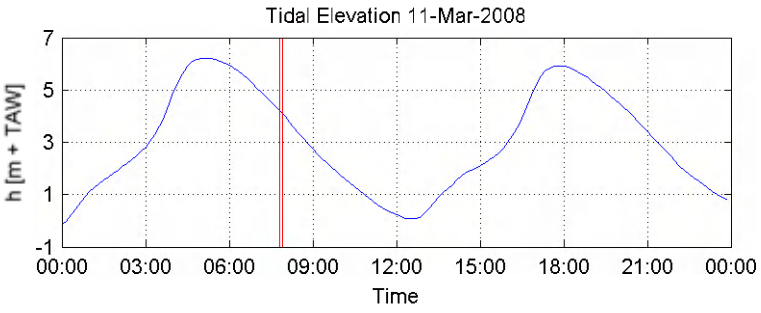
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3006Ktrl_sub.csv	Location: Transect K









HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
07:48 - 07:54

Time after HW [HH:MM]
2:51

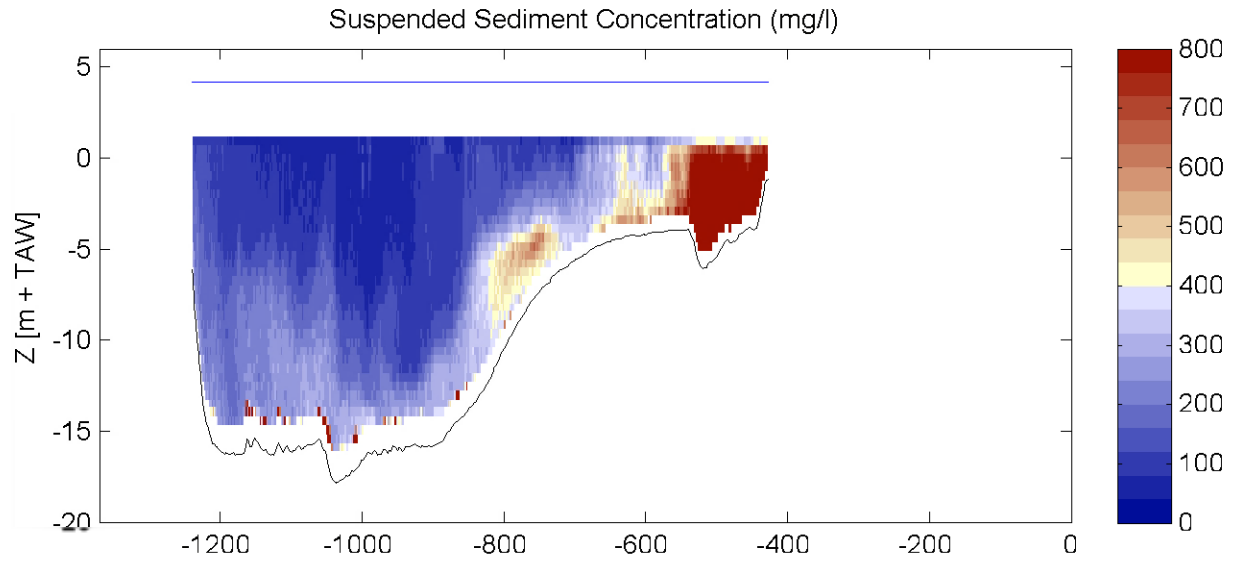
Data Processed by: IMDC

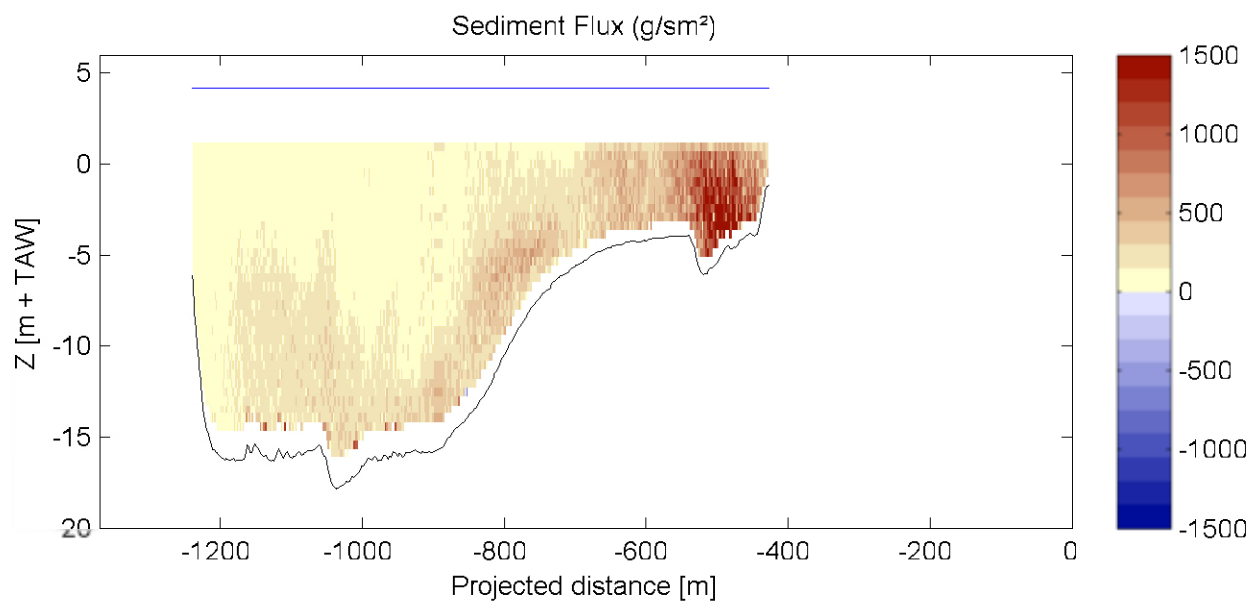
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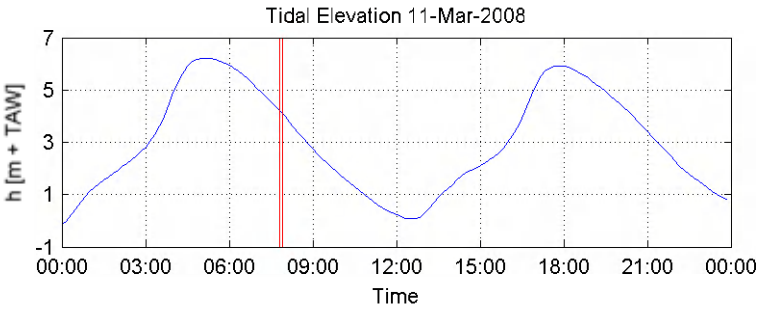
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3006Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
07:48 - 07:54

Time after HW [HH:MM]
2:51

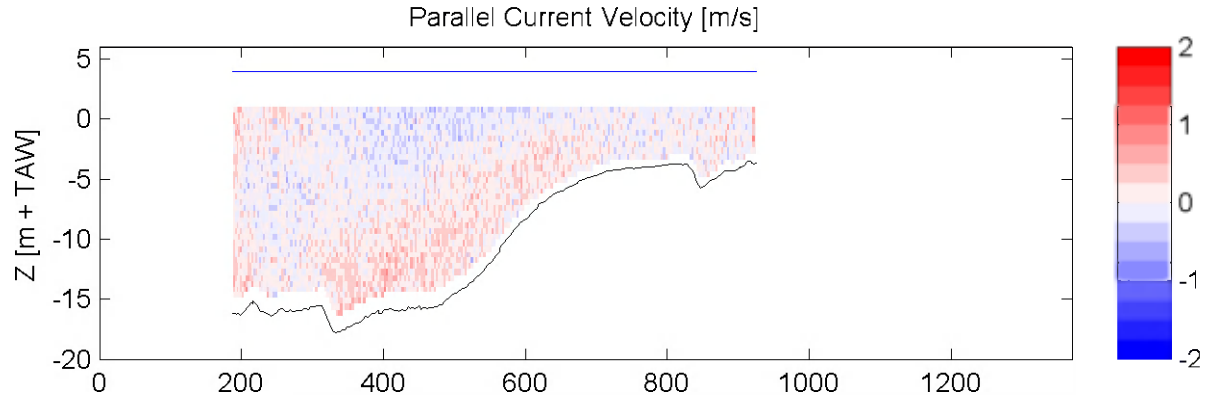
Data Processed by: IMDC

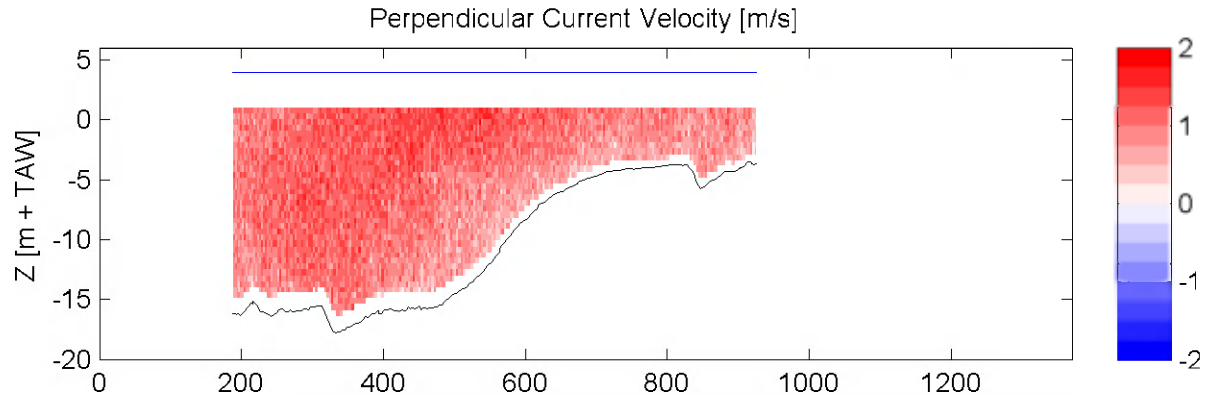
In association with :

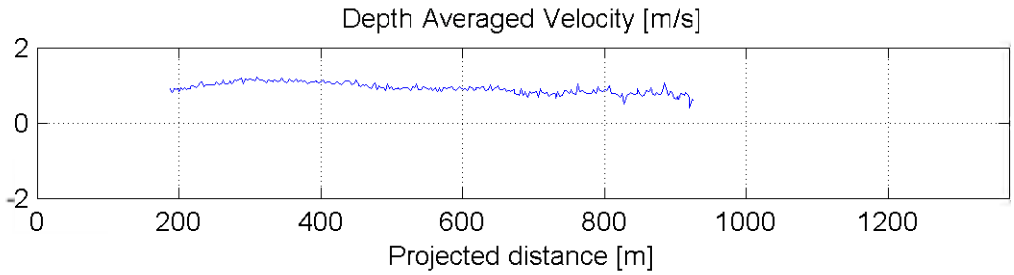
I/RA/11283/07.089/MSA

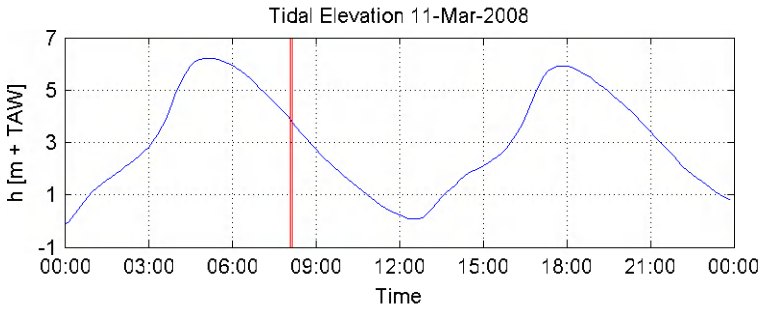
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3008Ktlr_sub.csv	Location: Transect K









HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

08:04 - 08:08

Time after HW [HH:MM]

3:06

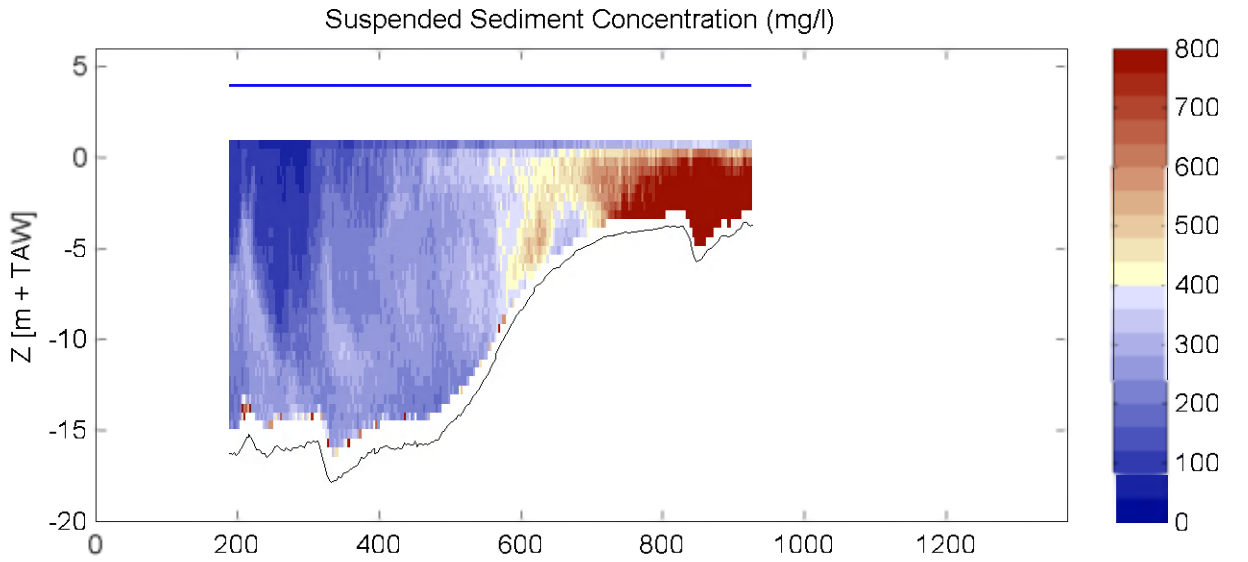
Data Processed by: IMDC

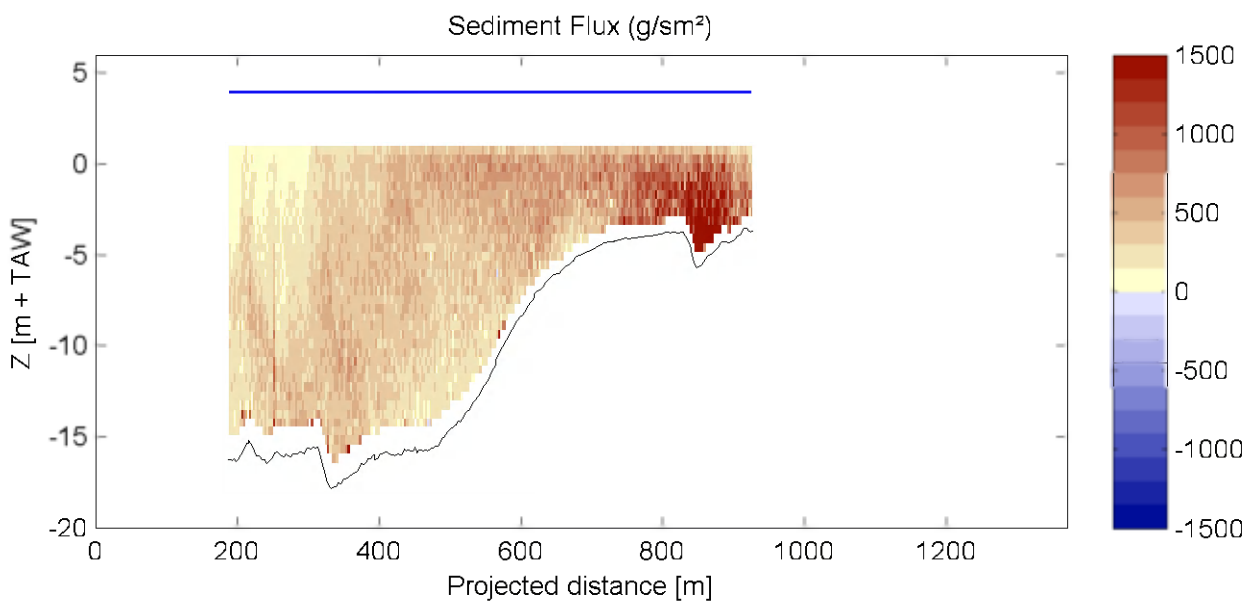
In association with :

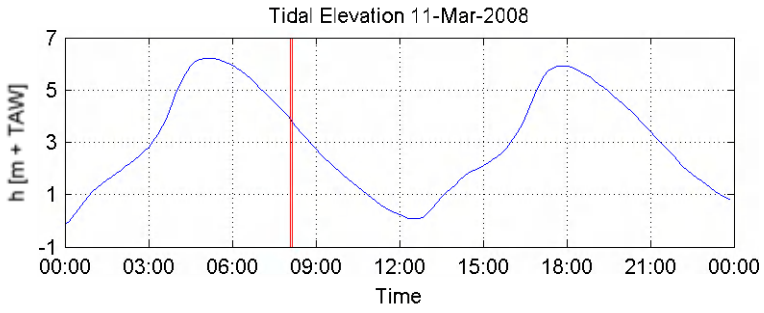
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3008Ktlr_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

08:04 - 08:08

Time after HW [HH:MM]

3:06

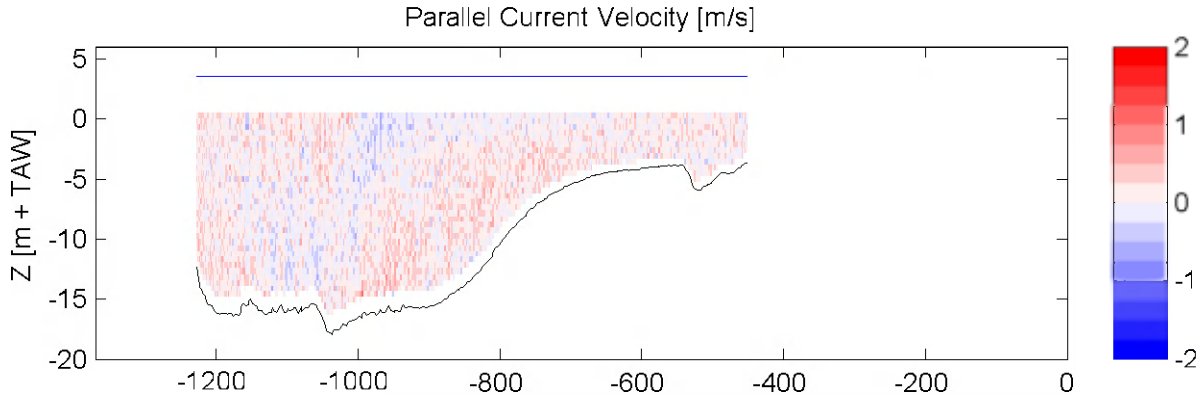
Data Processed by: IMDC

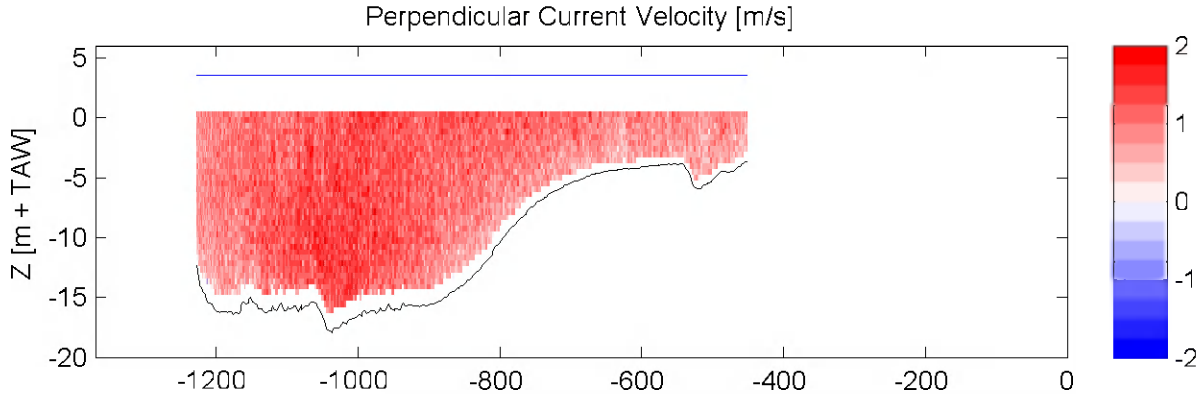
In association with : WL | delft hydraulics, GEMS

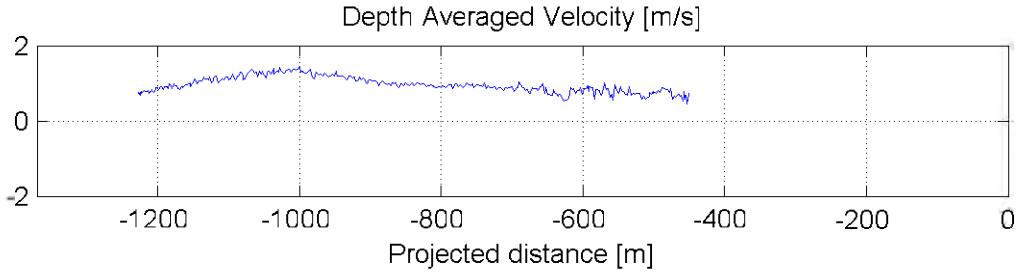
I/RA/11283/07.089/MSA

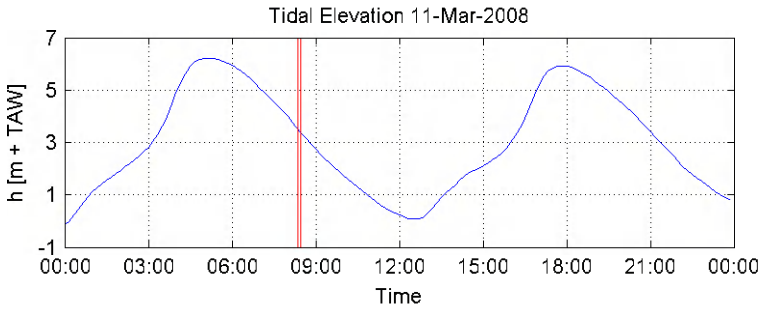
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3010Ktrl_sub.csv	Location: Transect K









HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

08:21 - 08:27

Time after HW [HH:MM]

3:24

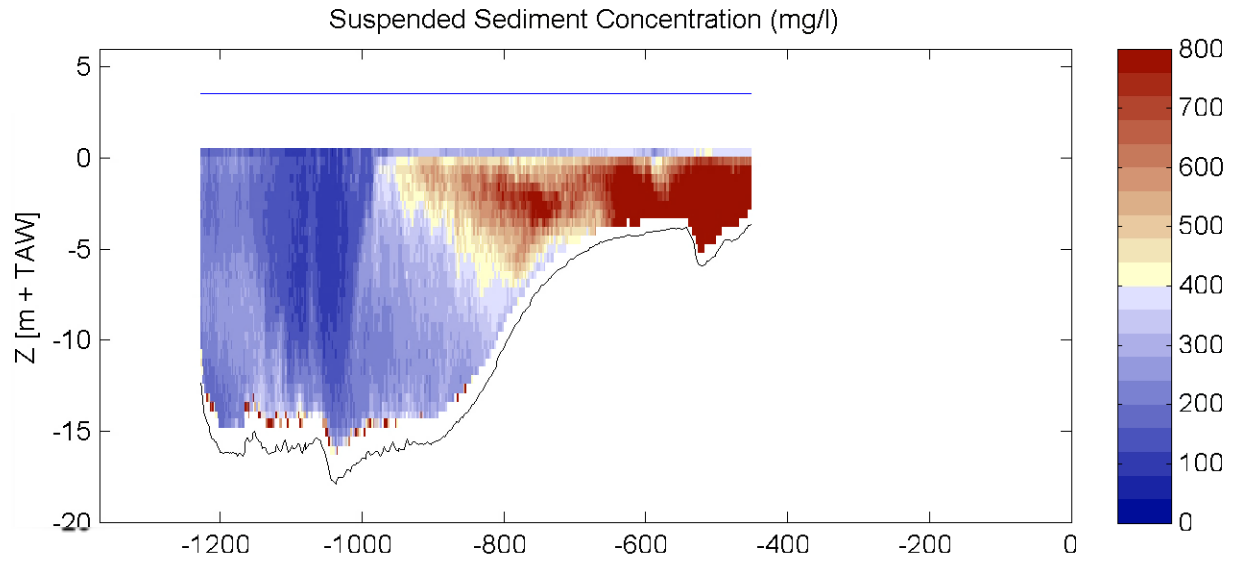
Data Processed by: IMDC

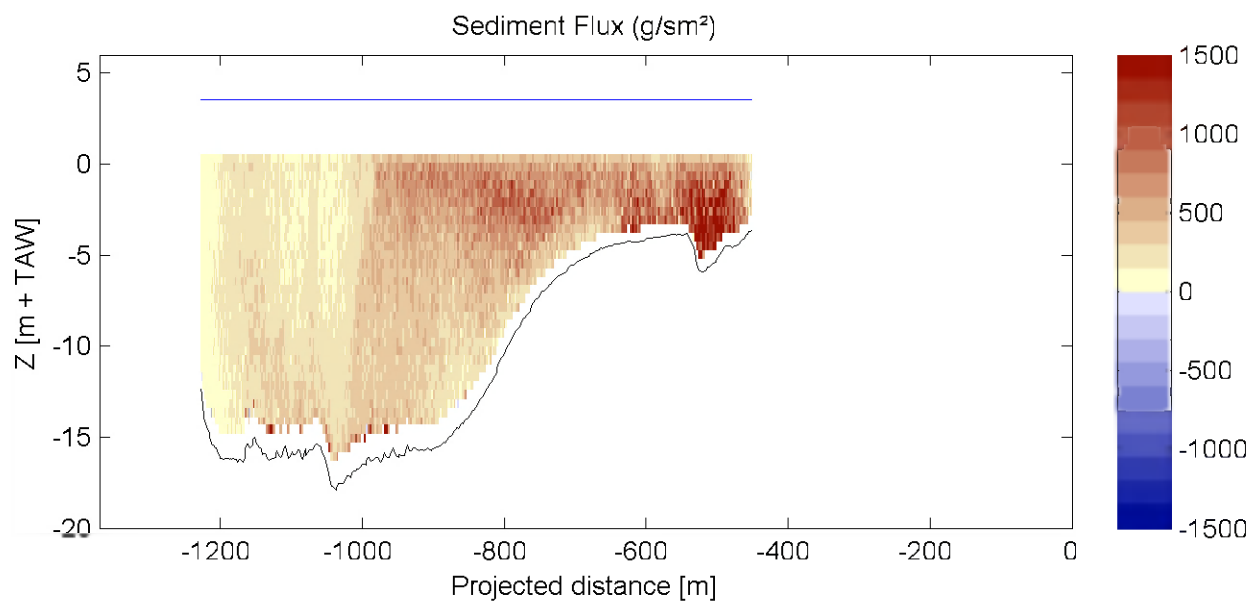
In association with :

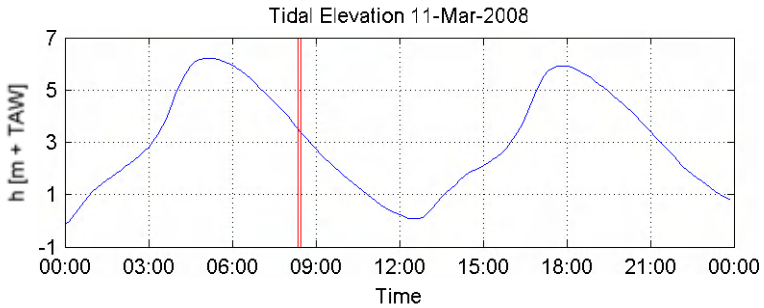
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3010Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
08:21 - 08:27

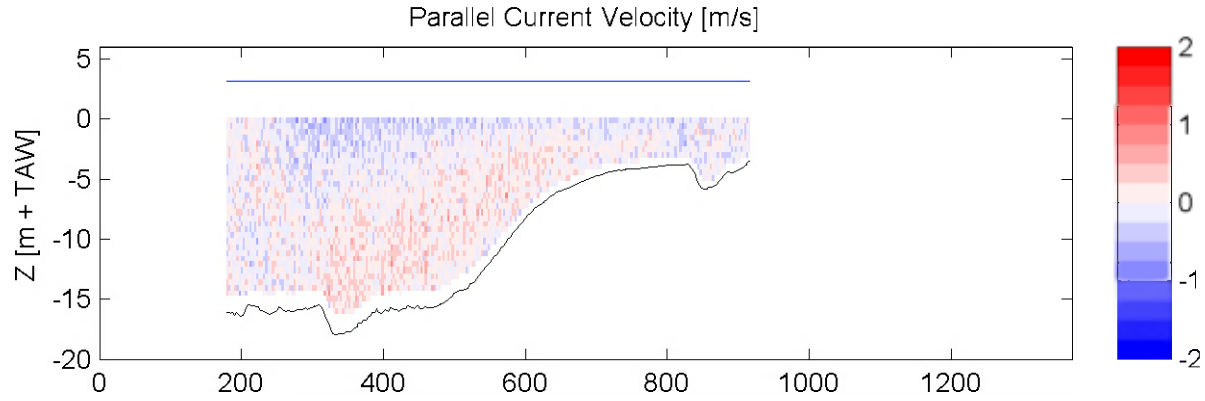
Time after HW [HH:MM]
3:24

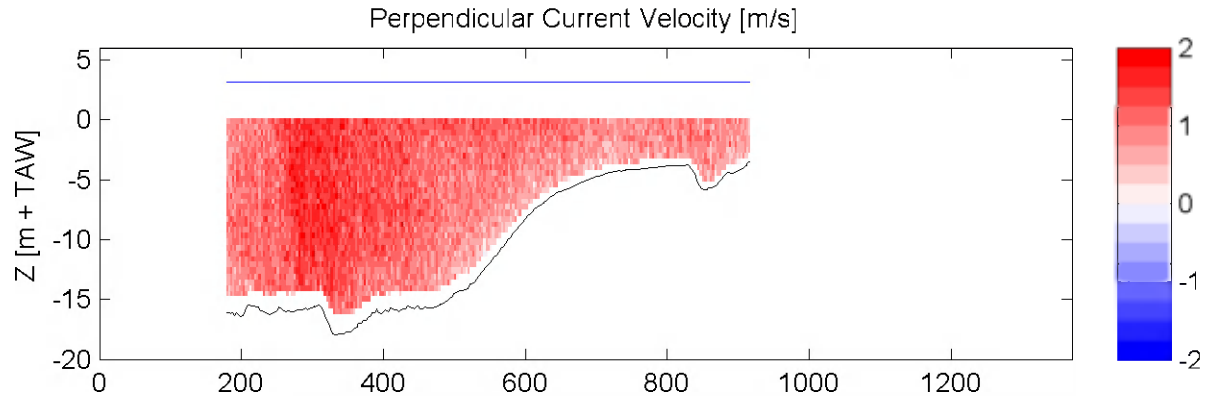
Data Processed by: IMDC
In association with :

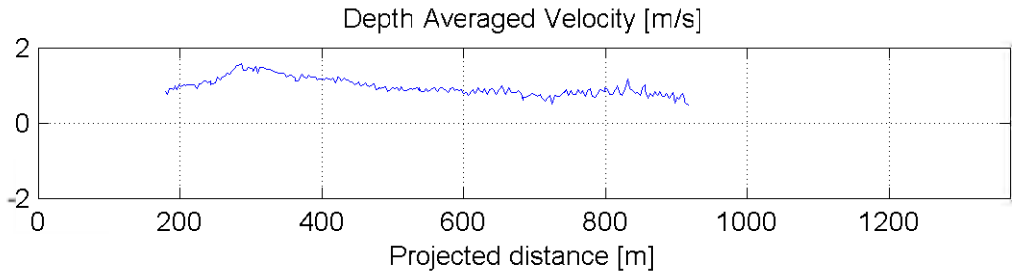
I/RA/11283/07.089/MSA

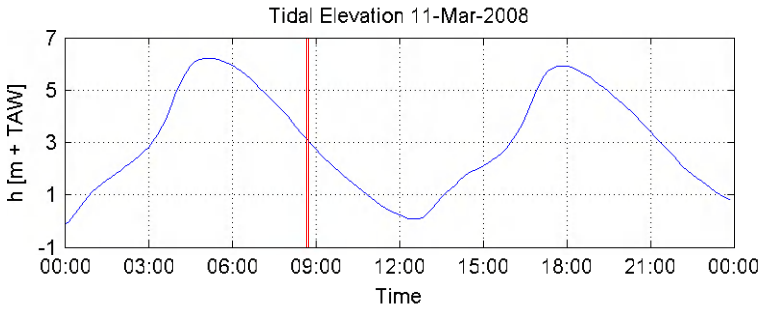
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3012Ktlr_sub.csv	Location: Transect K









HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

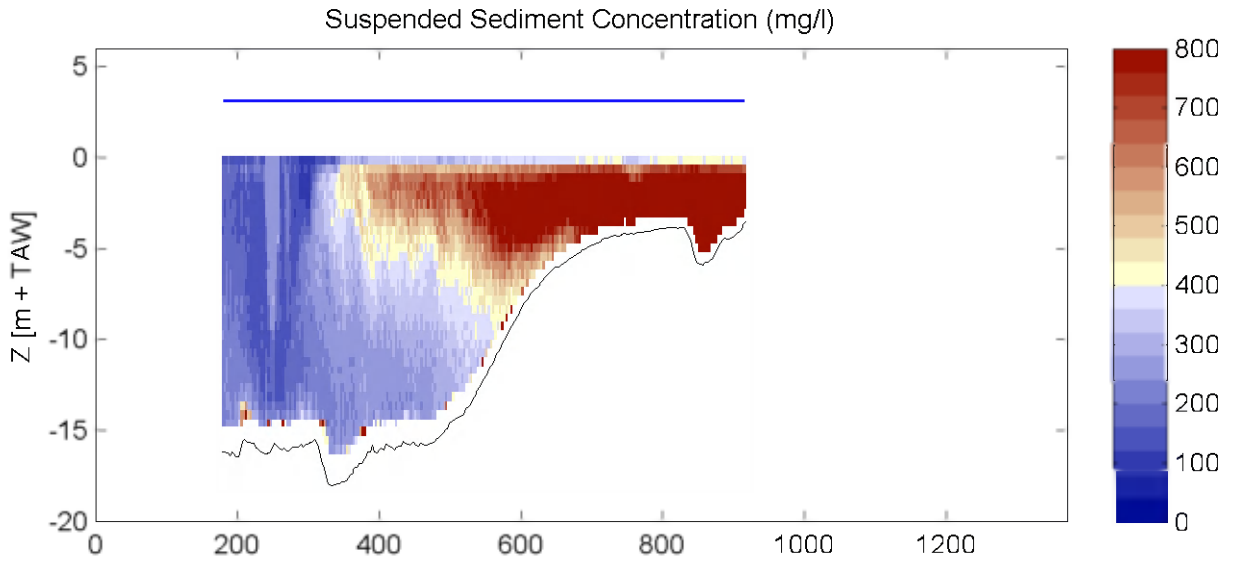
Date / Time [MET] :
11-Mar-2008
08:41 - 08:44

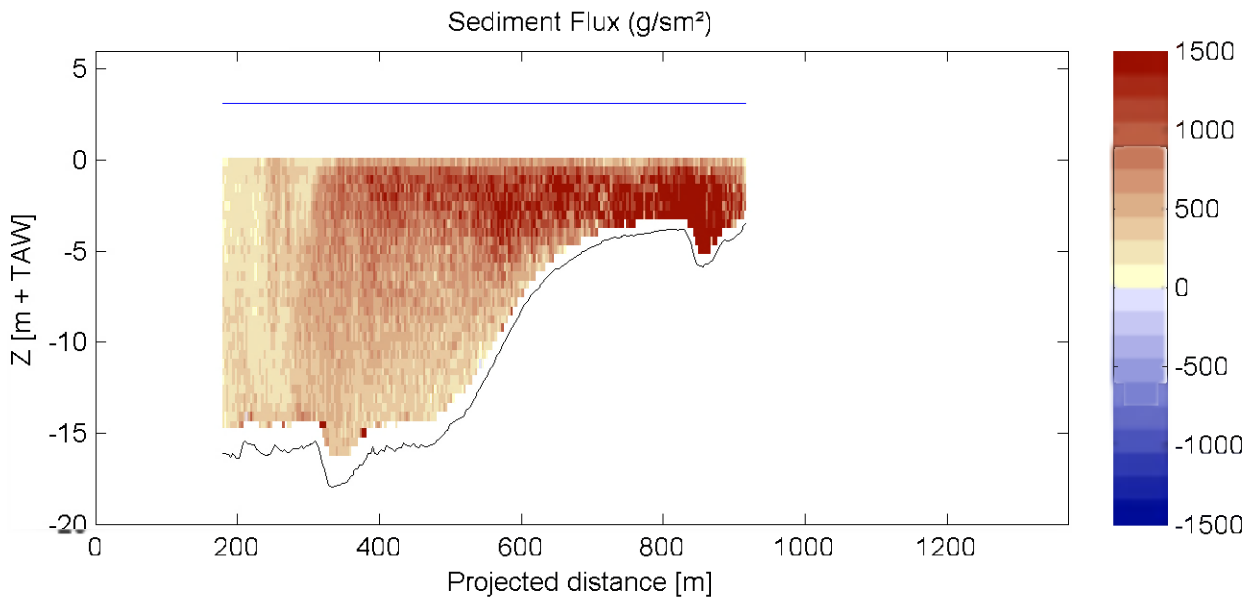
Time after HW [HH:MM]
3:43

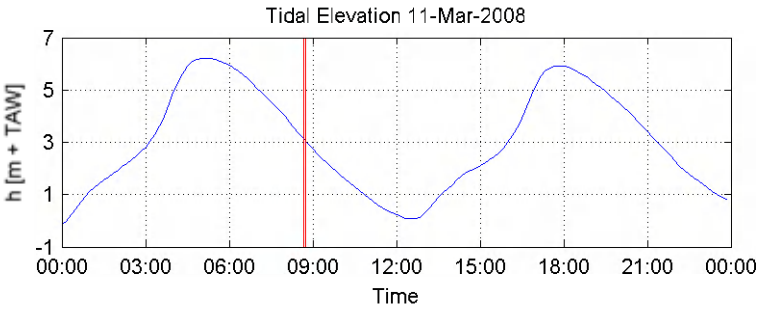
Data Processed by:
In association with :
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3012Ktlr_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

08:41 - 08:44

Time after HW [HH:MM]

3:43

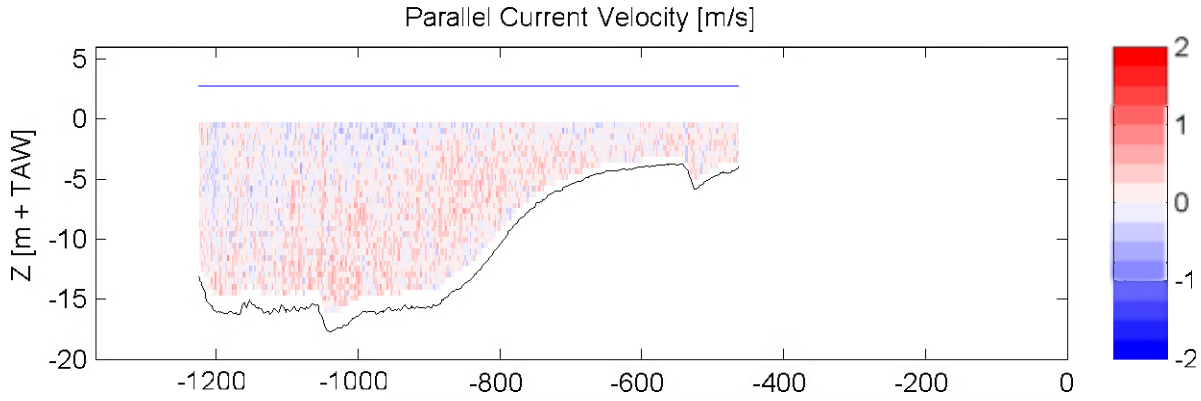
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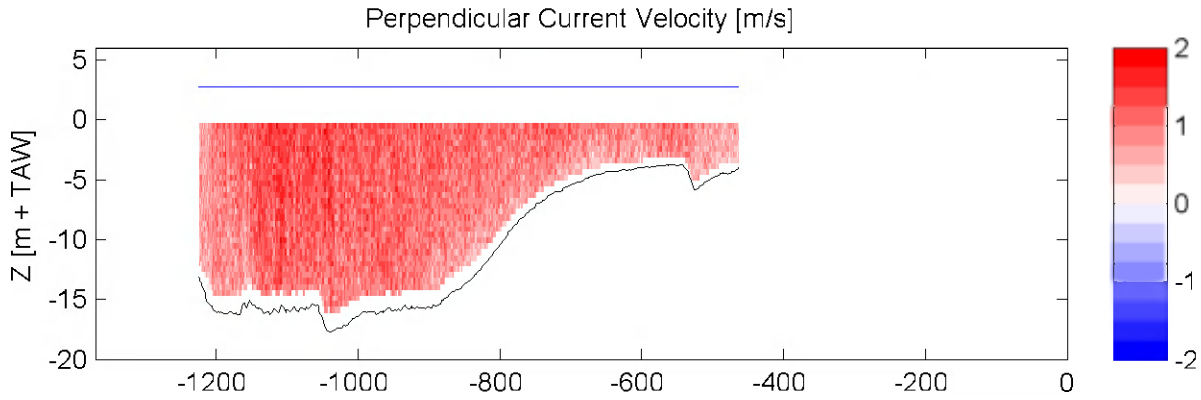
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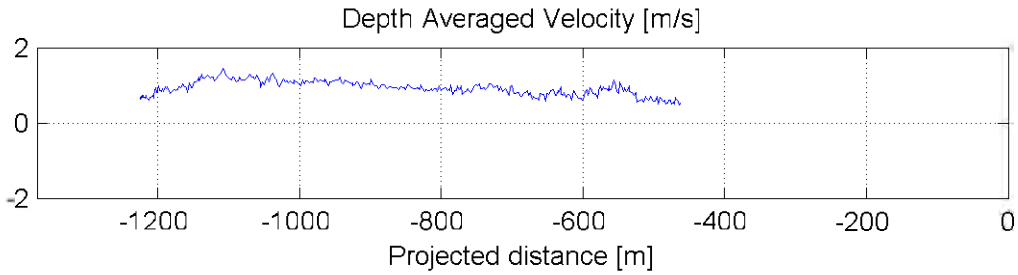
I/RA/11283/07.089/MSA

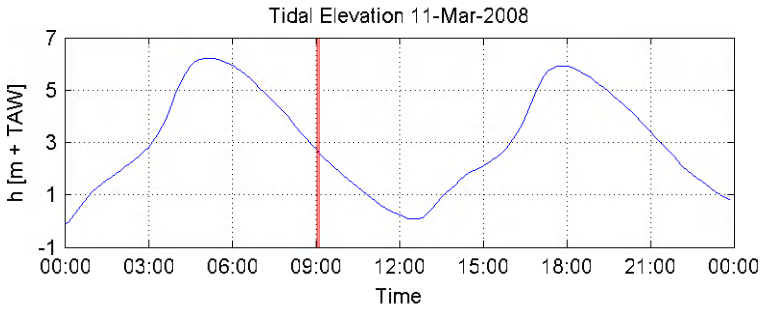
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3014Ktrl_sub.csv	Location: Transect K









HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
09:02 - 09:07

Time after HW [HH:MM]
4:05

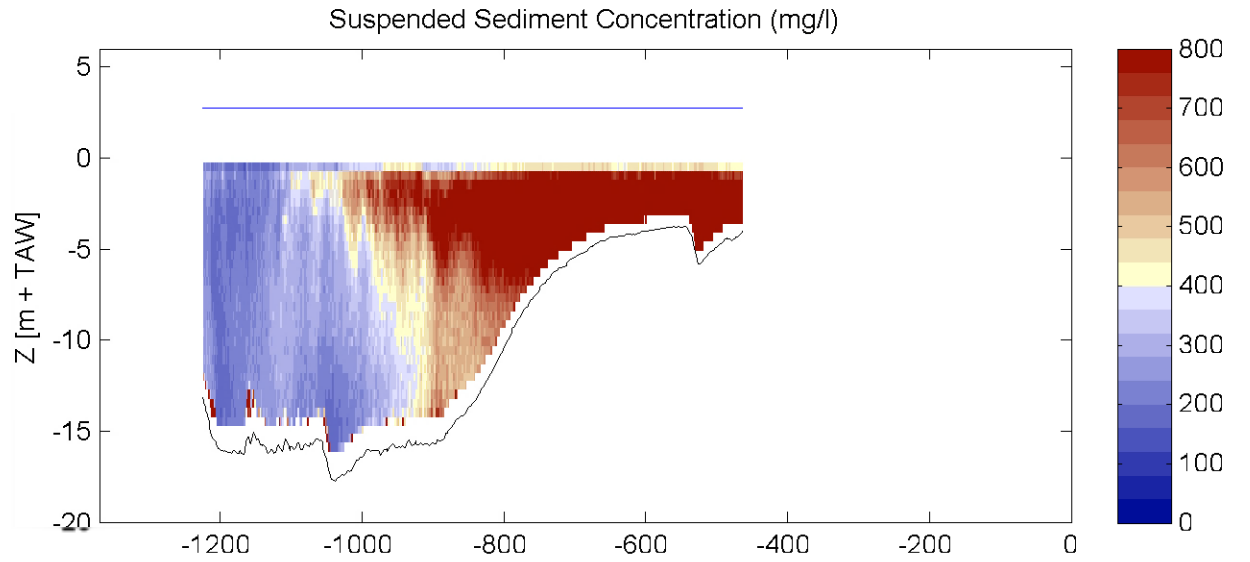
Data Processed by: IMDC

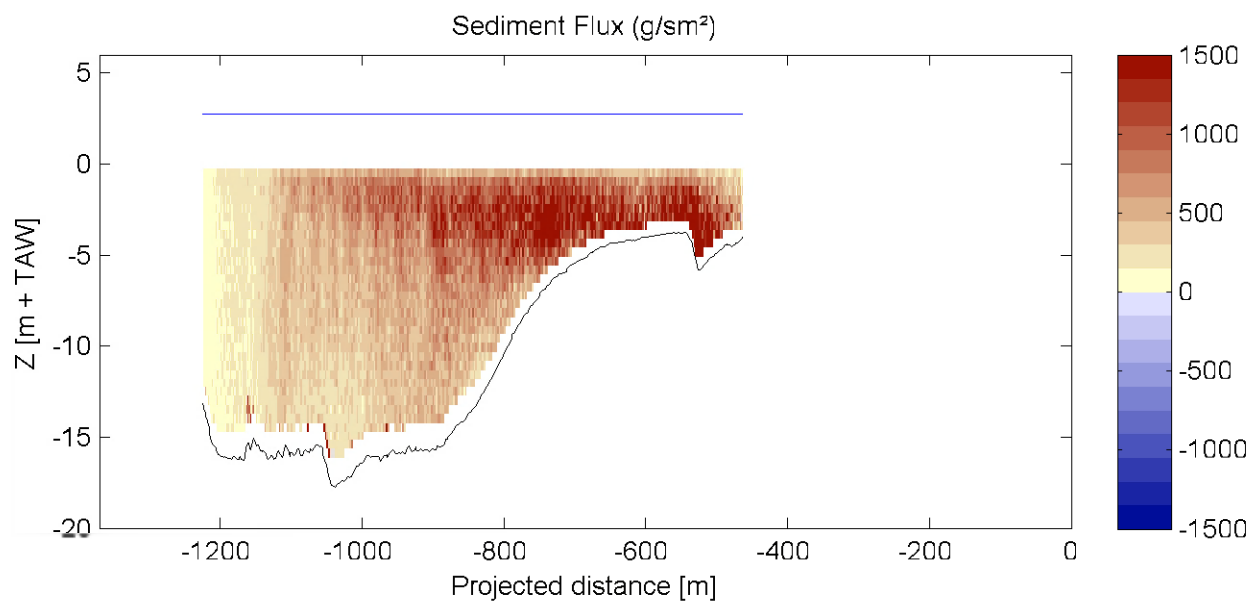
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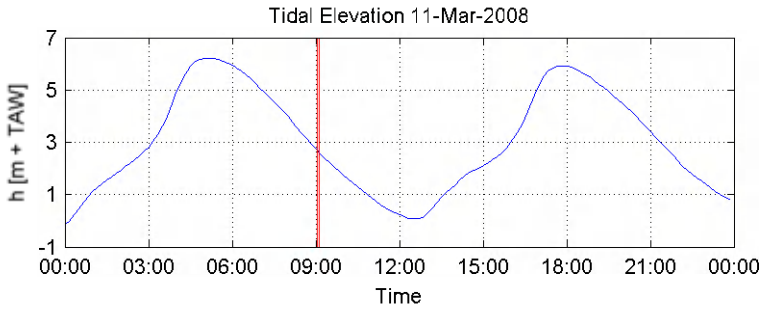
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3014Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
09:02 - 09:07

Time after HW [HH:MM]
4:05

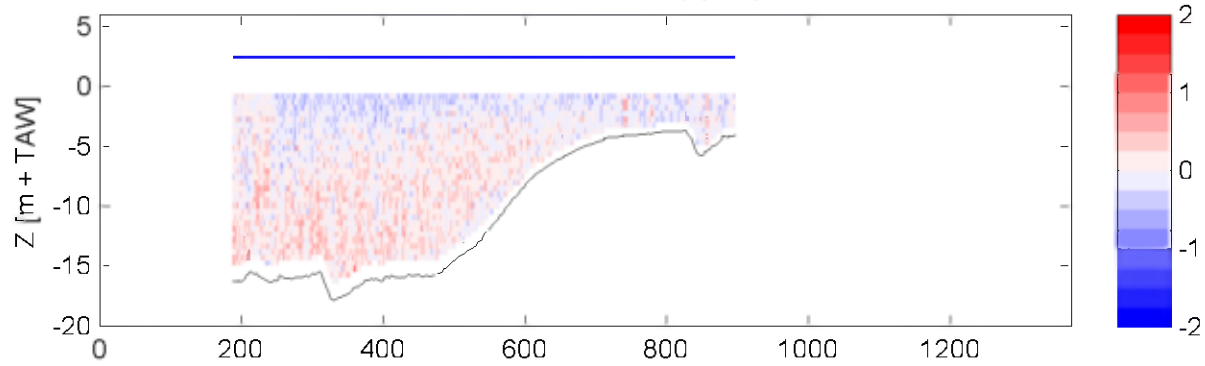
Data Processed by: IMDC
In association with :

I/RA/11283/07.089/MSA

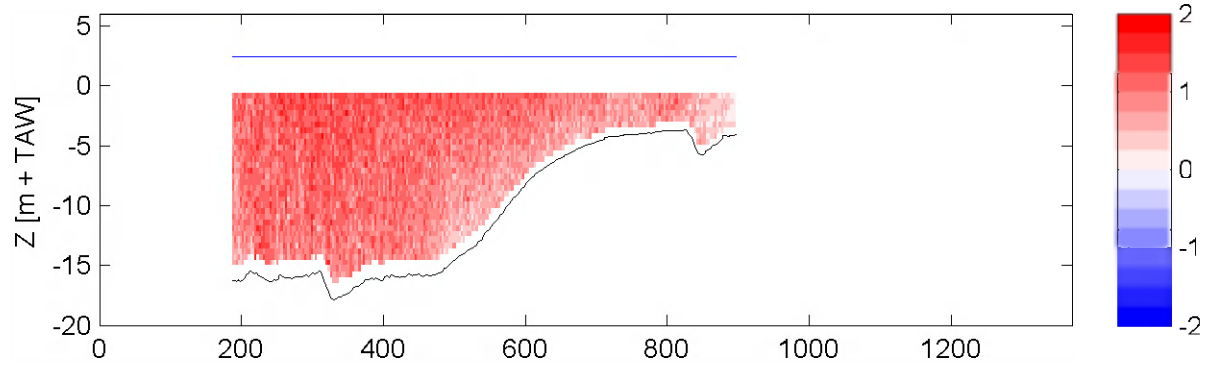
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3016Ktlr_sub.csv	Location: Transect K

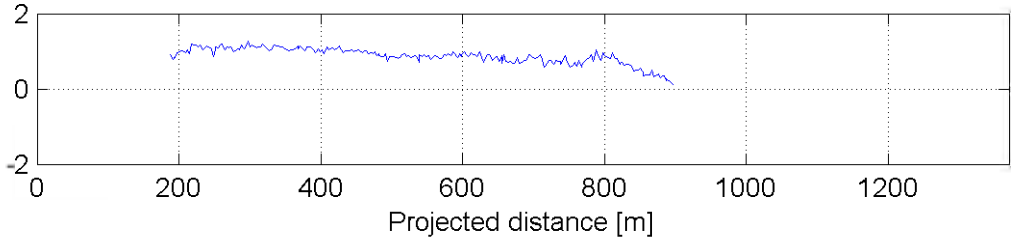
Parallel Current Velocity [m/s]



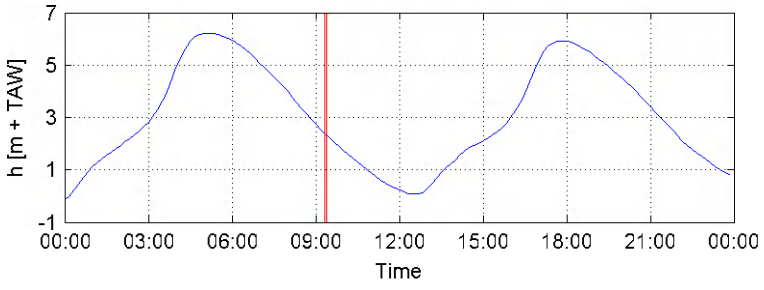
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
09:20 - 09:24

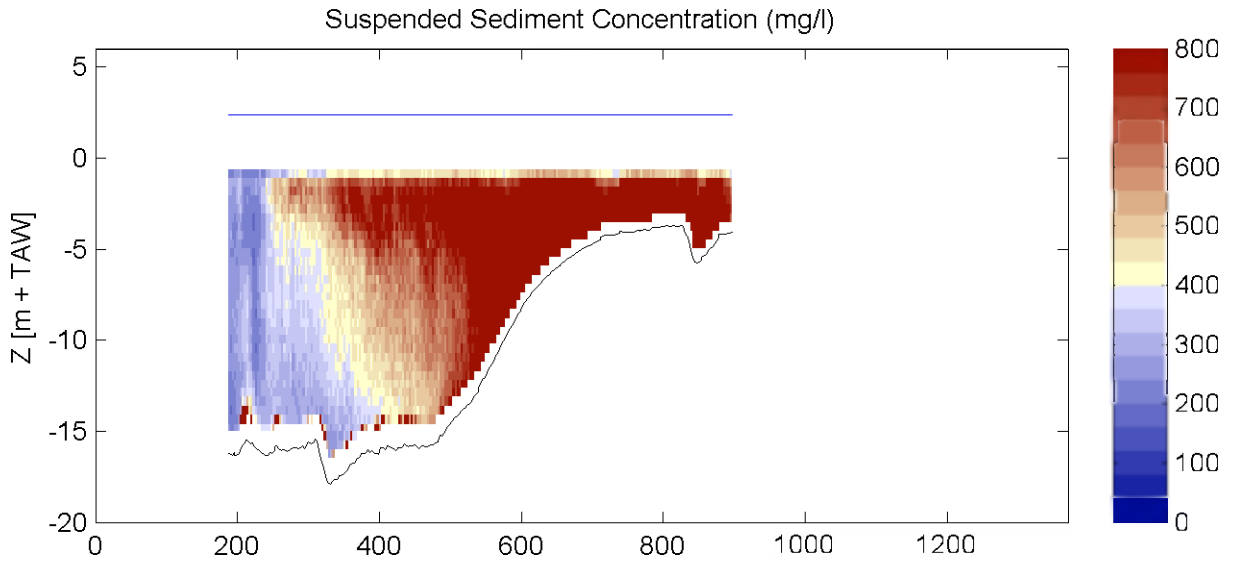
Time after HW [HH:MM]
4:22

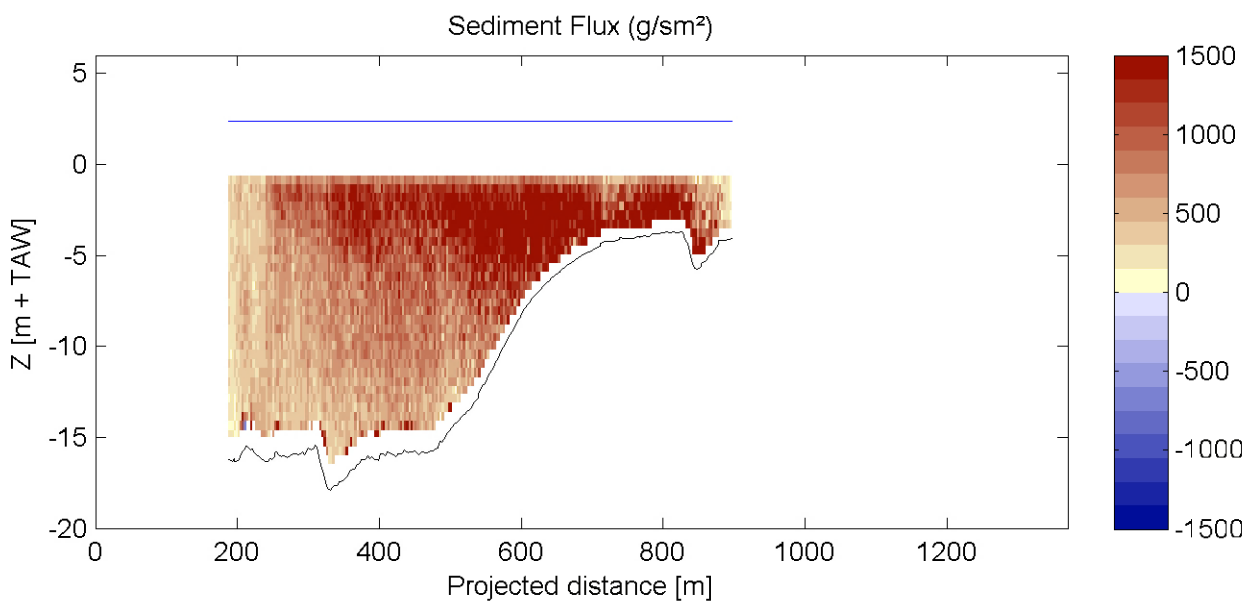
Data Processed by: IMDC
In association with :

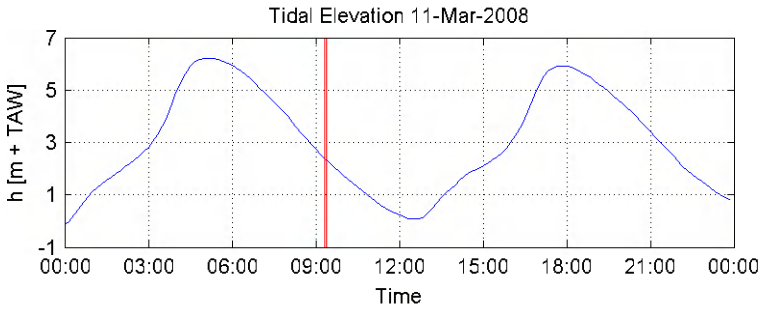
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3016Ktlr_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
09:20 - 09:24

Time after HW [HH:MM]
4:22

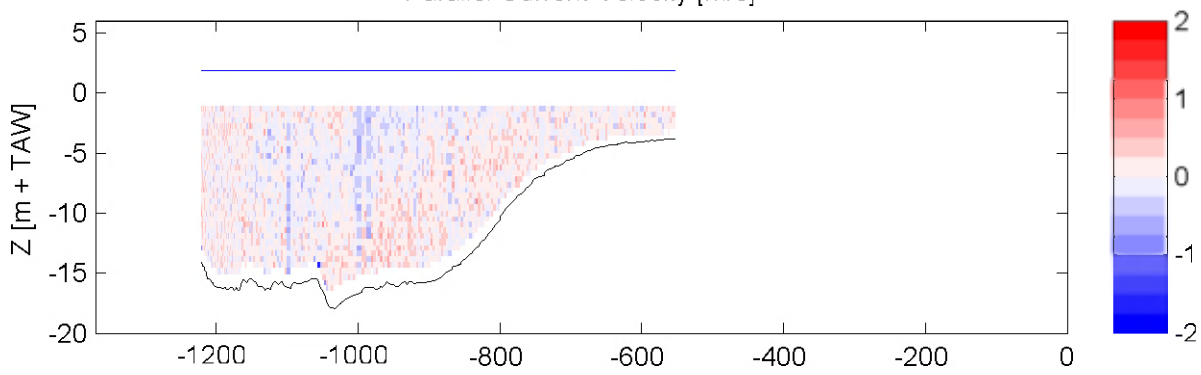
Data Processed by: IMDC
In association with :

I/RA/11283/07.089/MSA

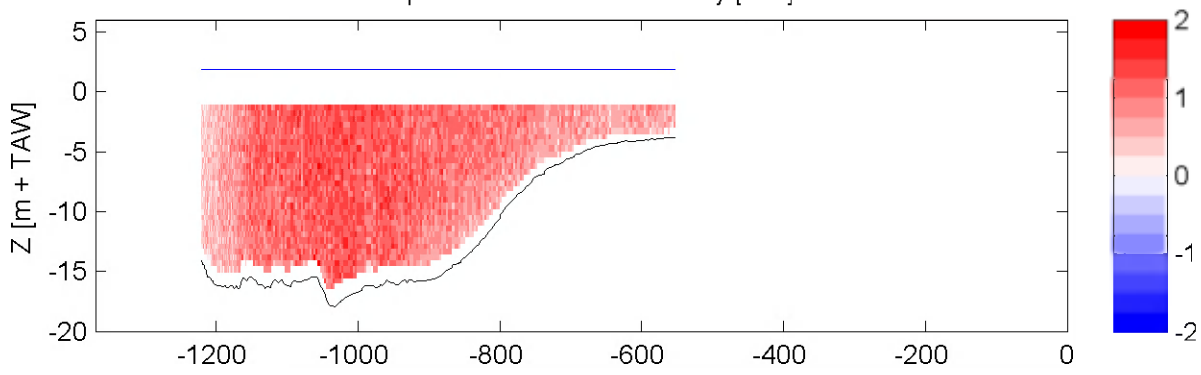
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3017Ktrl_sub.csv	Location: Transect K

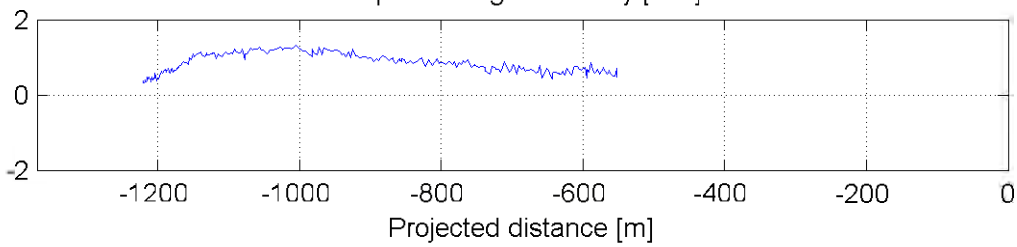
Parallel Current Velocity [m/s]



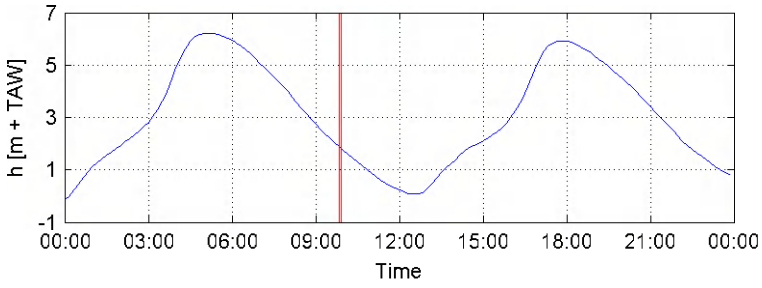
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

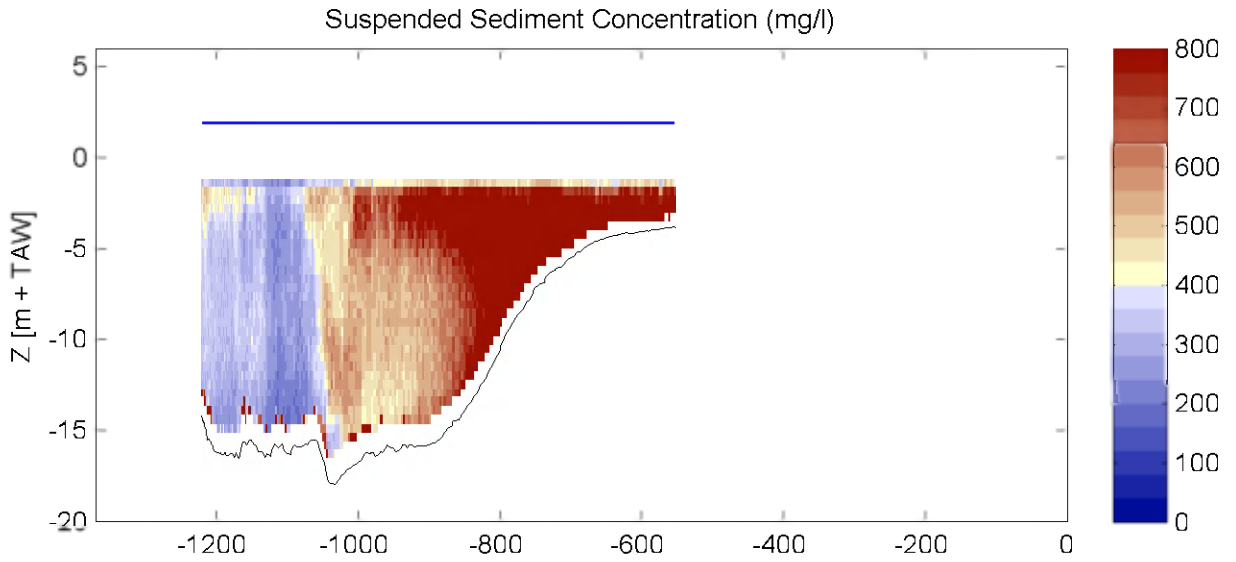
Date / Time [MET] :
11-Mar-2008
09:49 - 09:54

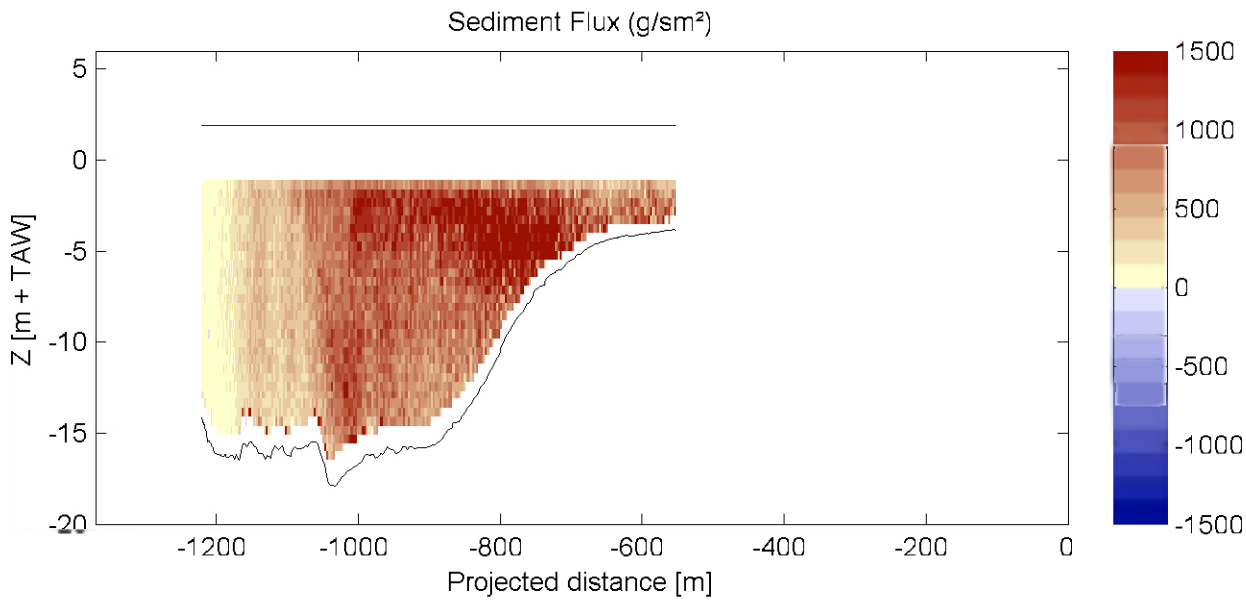
Time after HW [HH:MM]
4:52

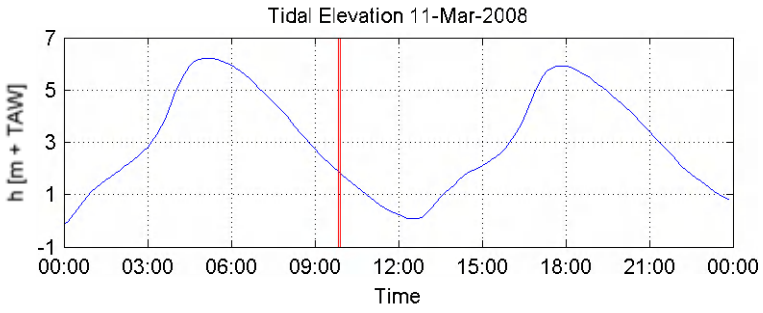
Data Processed by:
In association with :
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3017Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
09:49 - 09:54

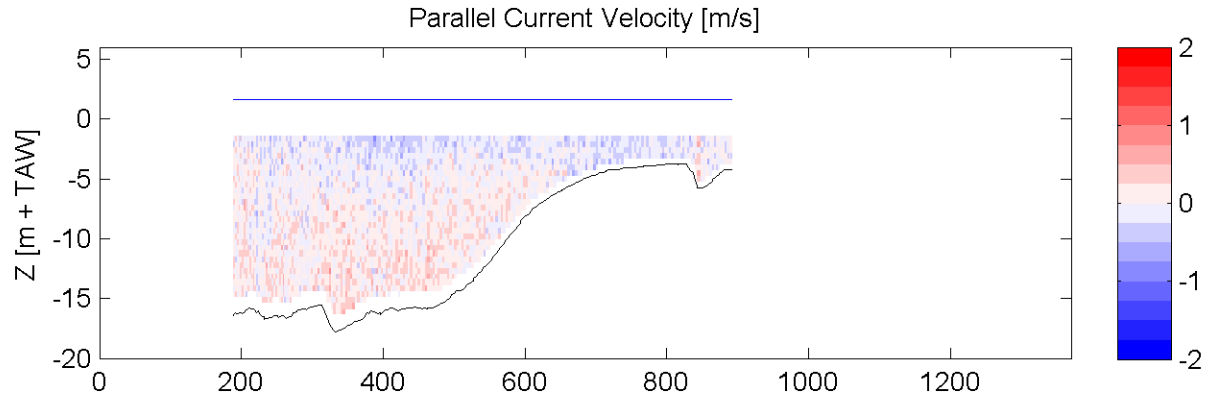
Time after HW [HH:MM]
4:52

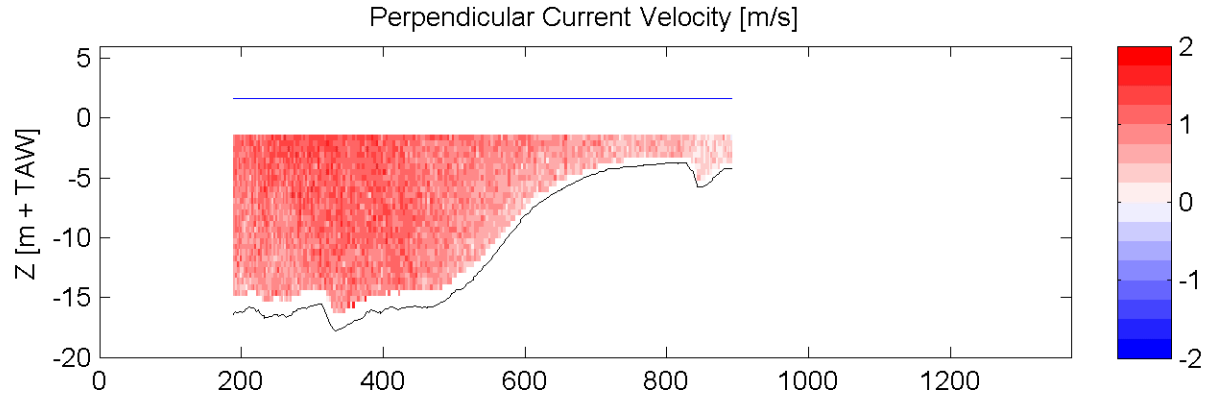
Data Processed by: IMDC
In association with :

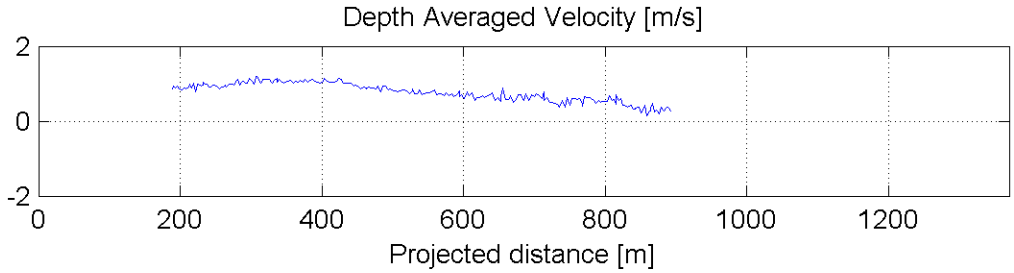
I/RA/11283/07.089/MSA

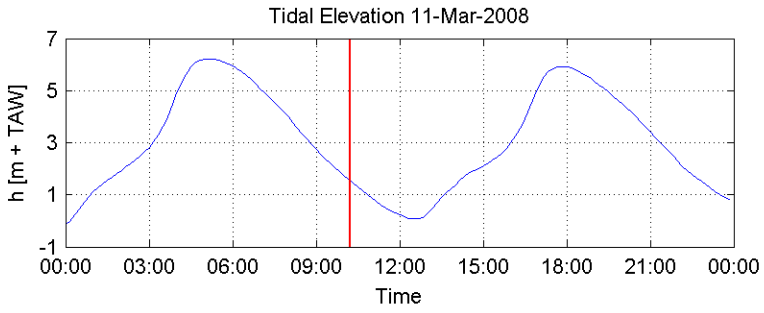
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3019Ktlr_sub.csv	Location: Transect K









HW/LW: 05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

10:10 - 10:14

Time after HW [HH:MM]

5:12

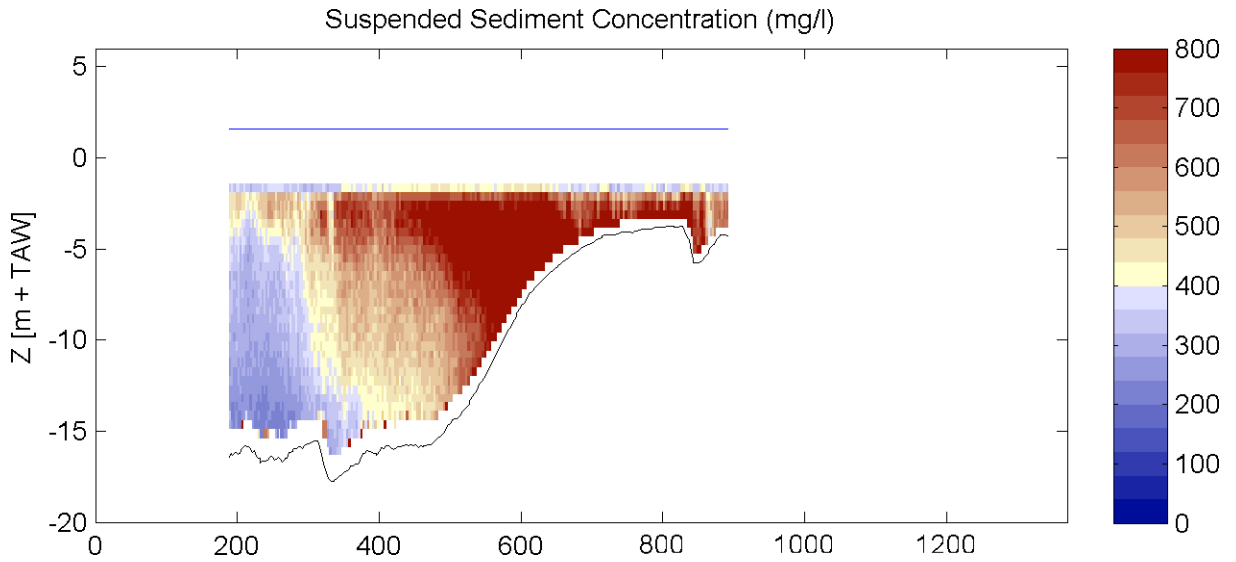
Data Processed by: IMDC

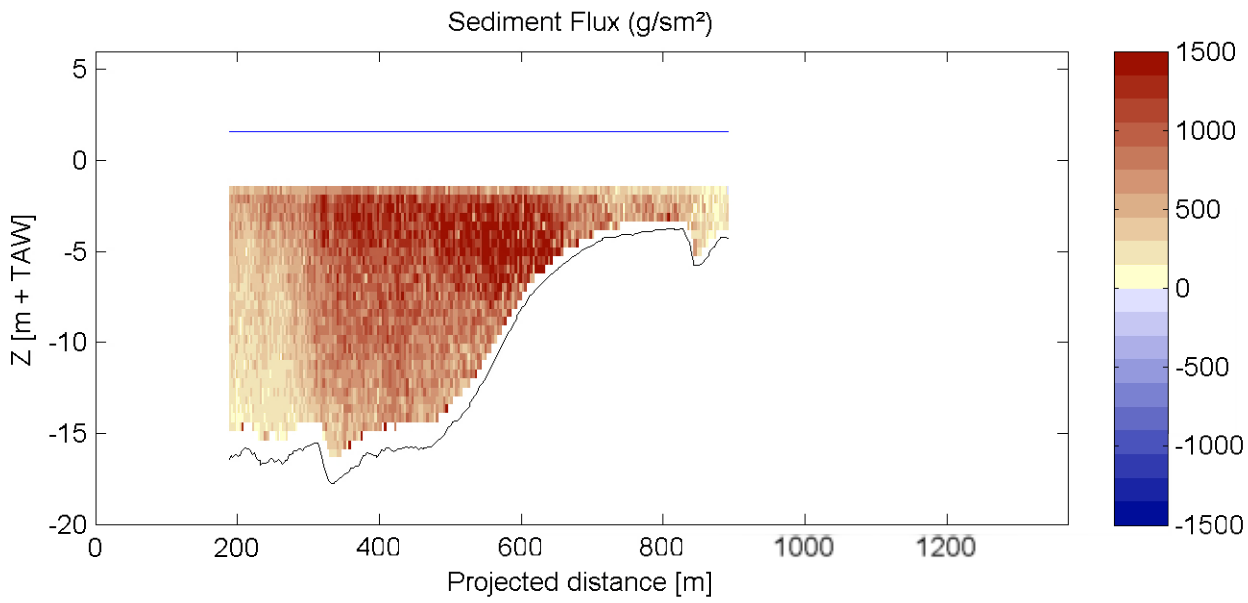
In association with : WL | delft hydraulics, GEMS International

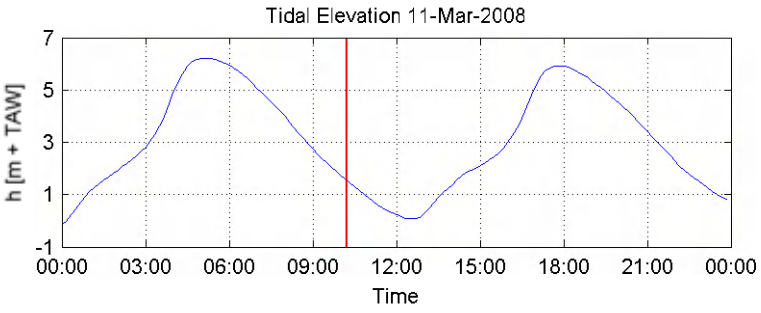
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3019Ktlr_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
10:10 - 10:14

Time after HW [HH:MM]
5:12

Data Processed by: IMDC

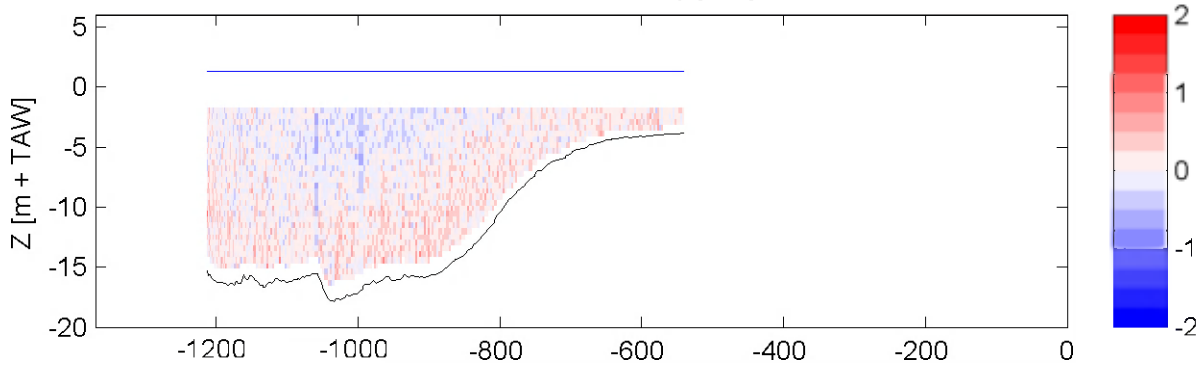
In association with :

I/RA/11283/07.089/MSA

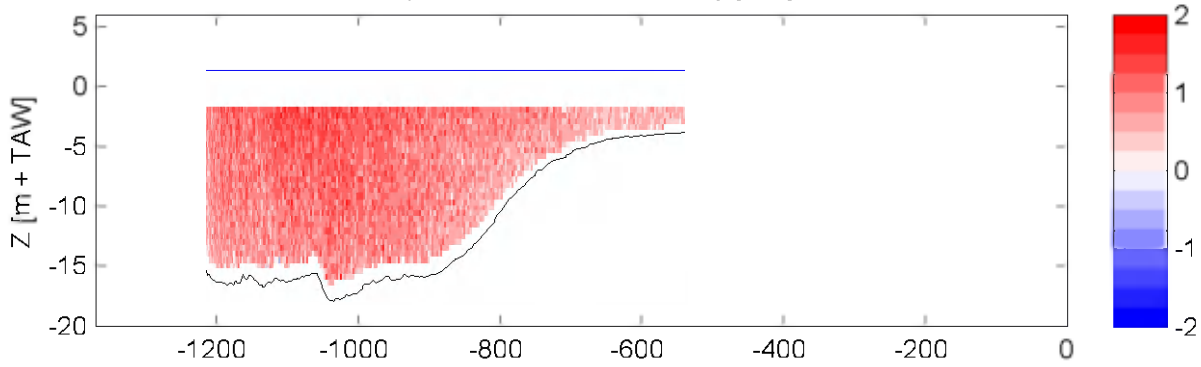
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3021Ktrl_sub.csv	Location: Transect K

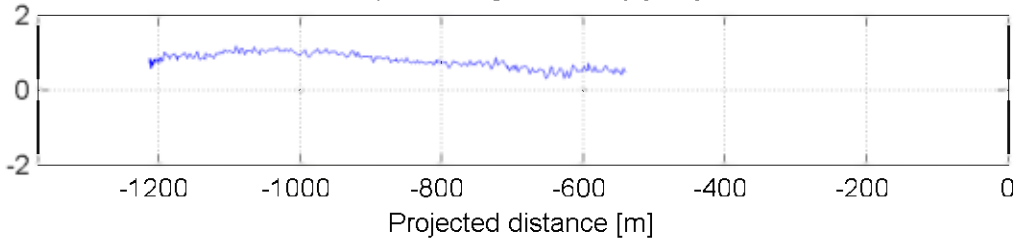
Parallel Current Velocity [m/s]



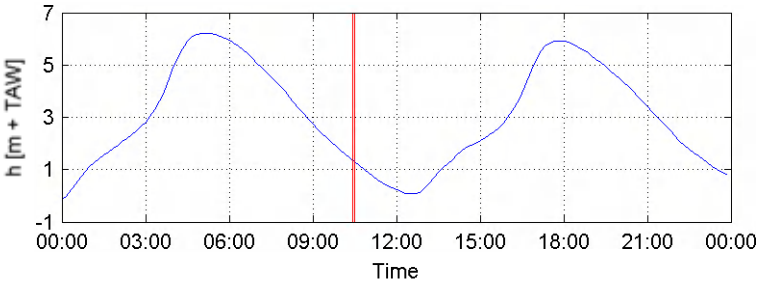
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
10:26 - 10:30

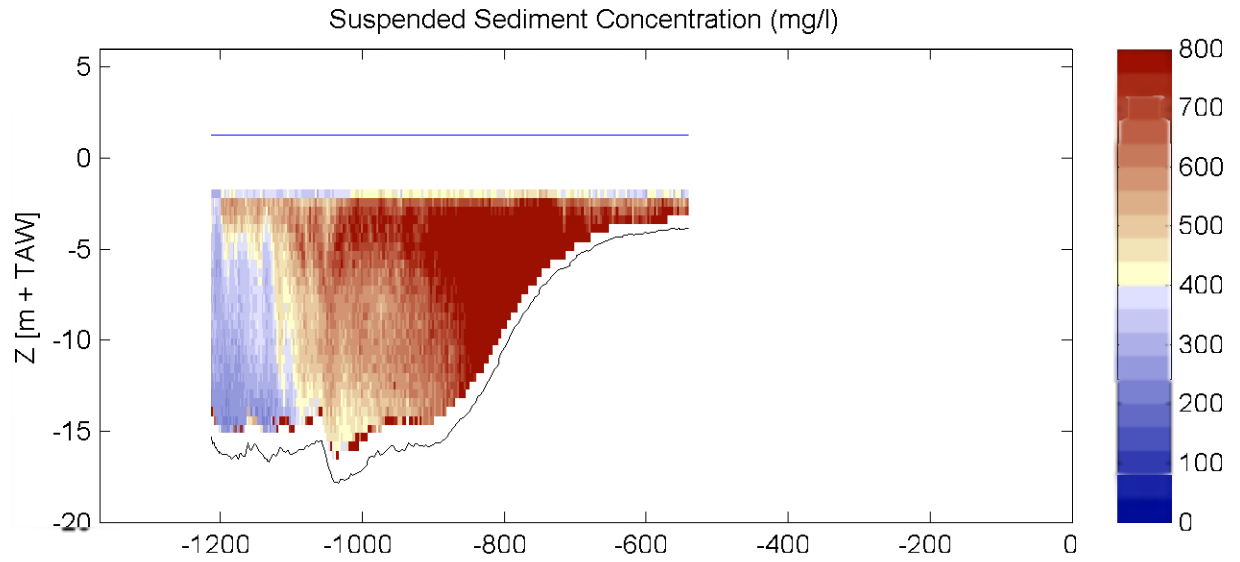
Time after HW [HH:MM]
5:28

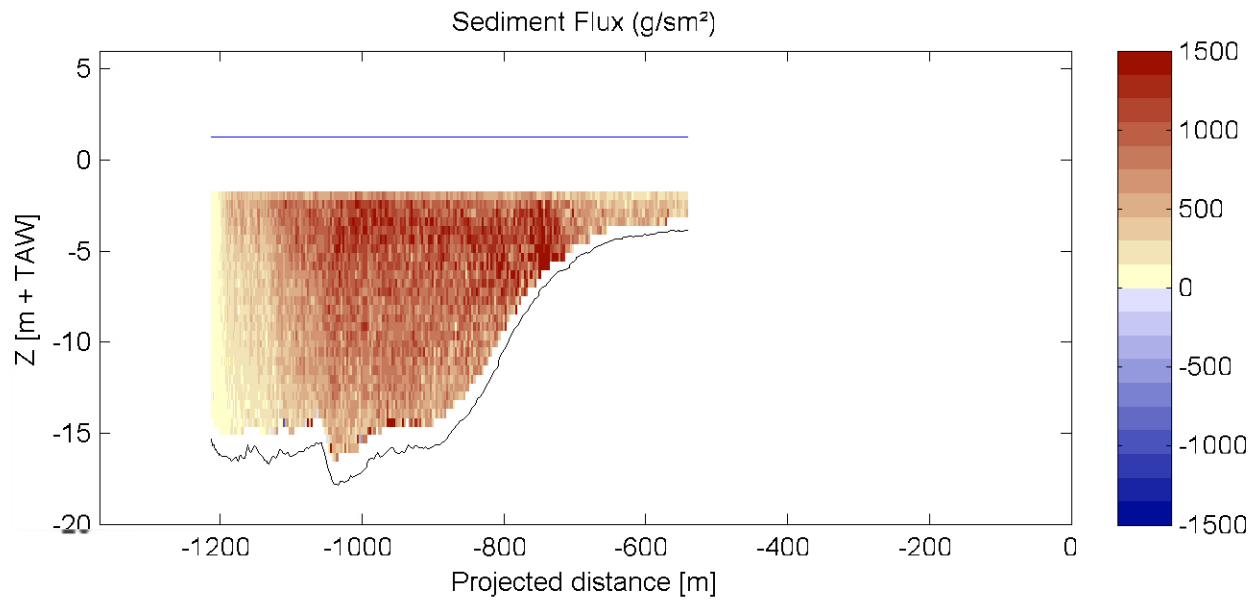
Data Processed by: IMDC
In association with :

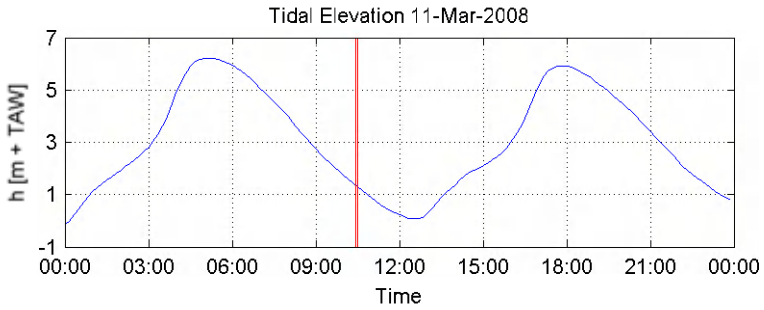
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3021Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
10:26 - 10:30

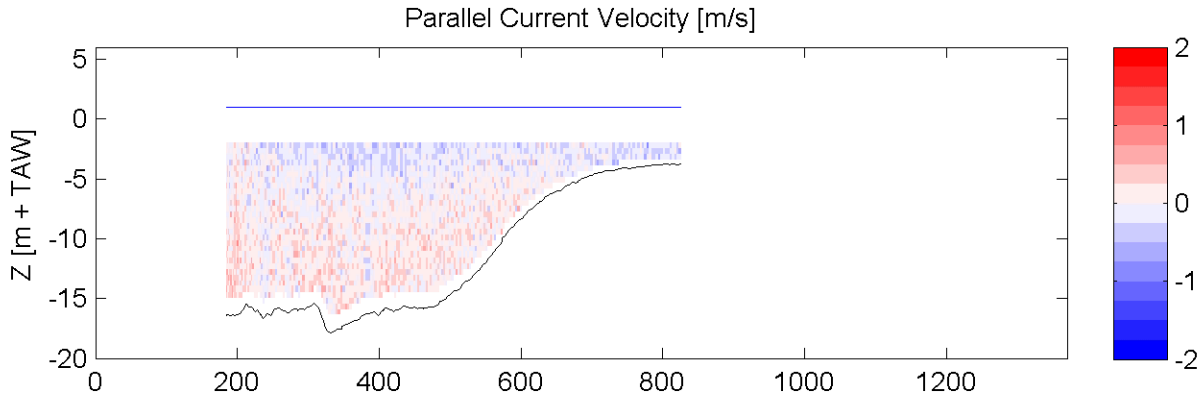
Time after HW [HH:MM]
5:28

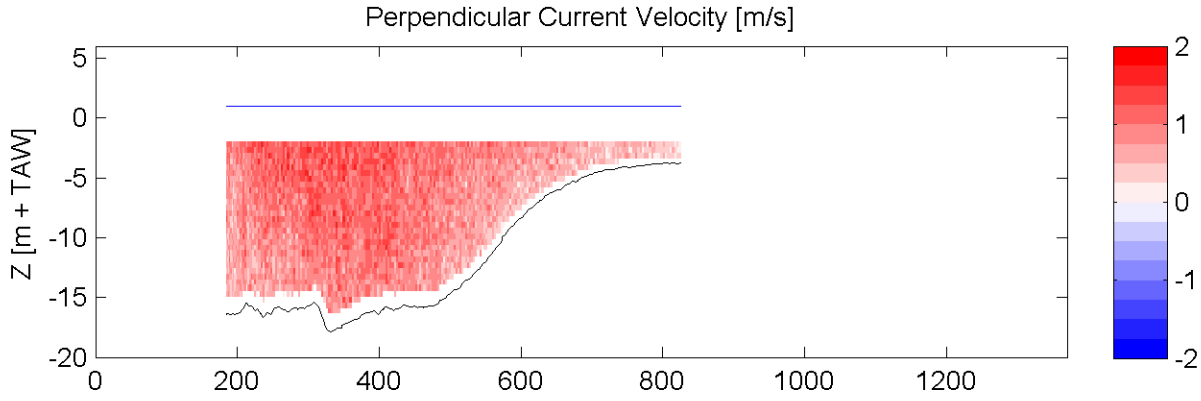
Data Processed by: IMDC
In association with :

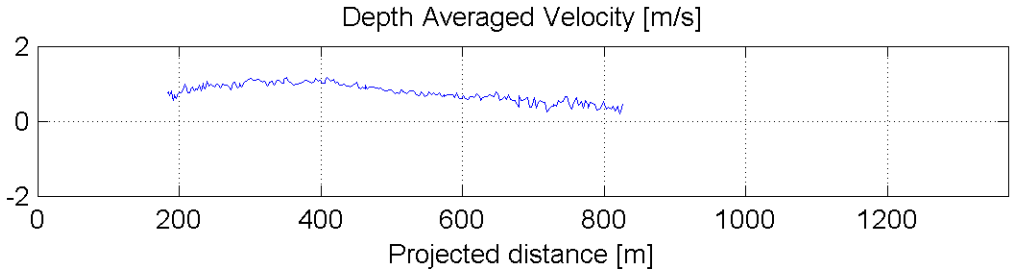
I/RA/11283/07.089/MSA

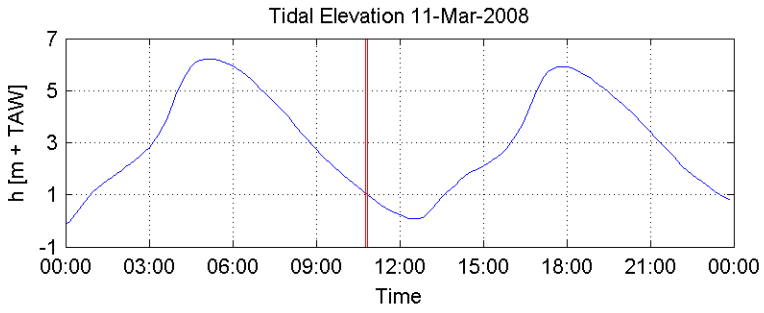
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3023Ktlr_sub.csv	Location: Transect K









HW/LW: 05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

10:47 - 10:50

Time after HW [HH:MM]

5:49

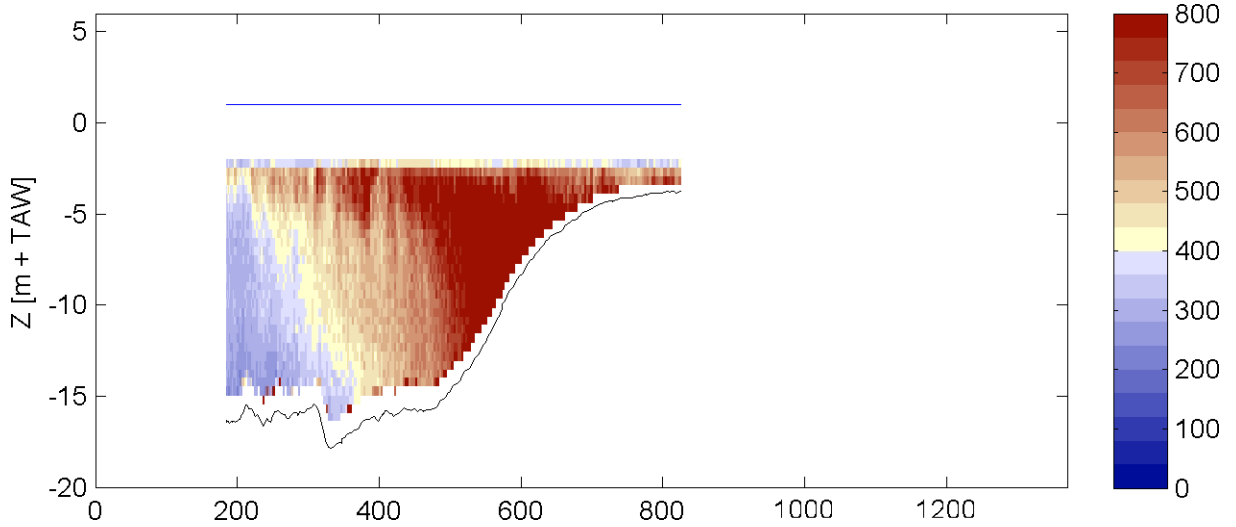
Data Processed by: IMDC

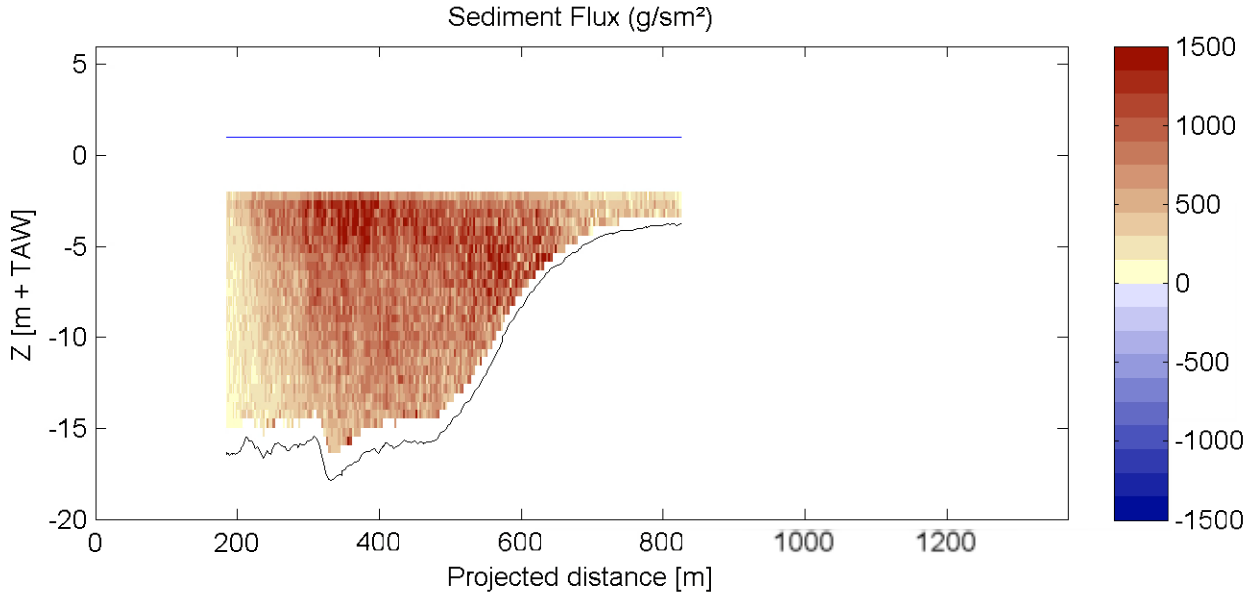
In association with : WL | delft hydraulics, GEMS International

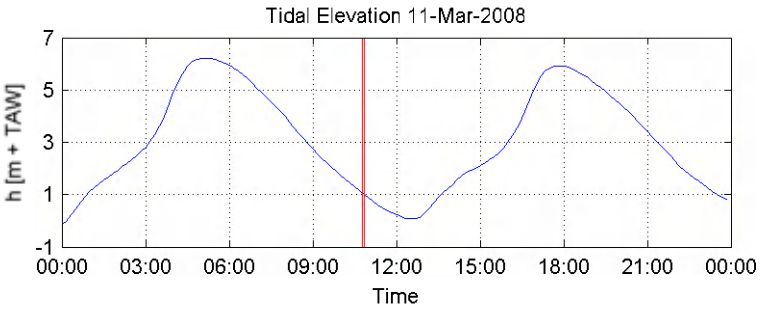
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3023Ktlr_sub.csv	Location: Transect K







HW/LW: 05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

10:47 - 10:50

Time after HW [HH:MM]

5:49

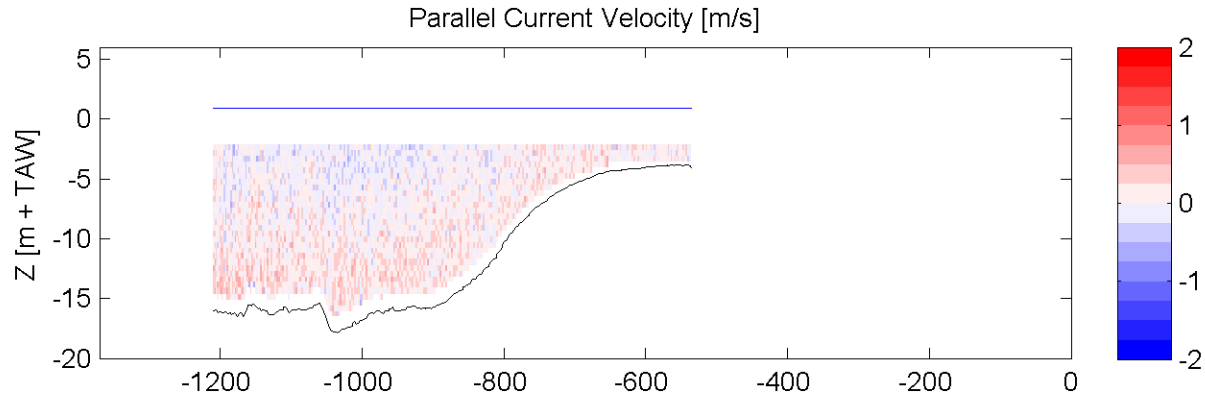
Data Processed by: IMDC

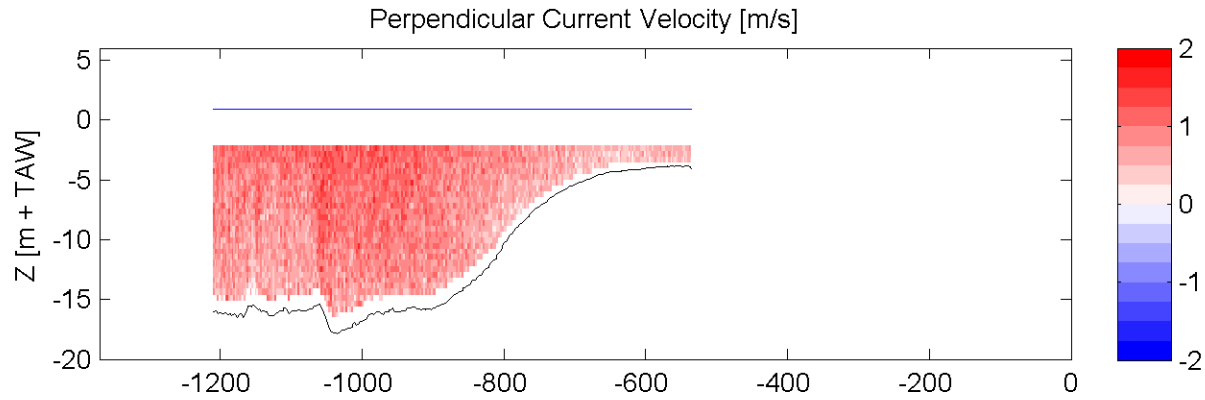
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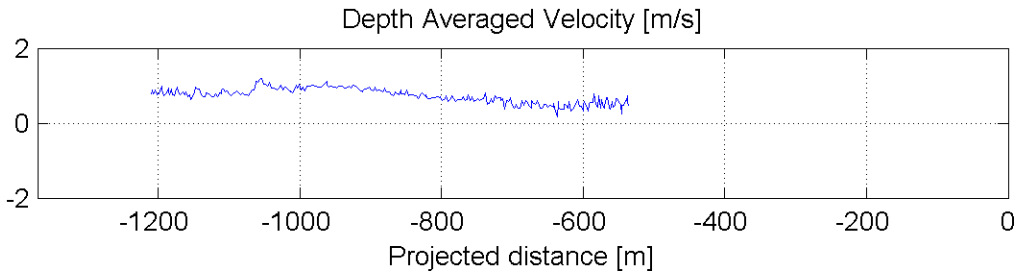
I/RA/11283/07.089/MSA

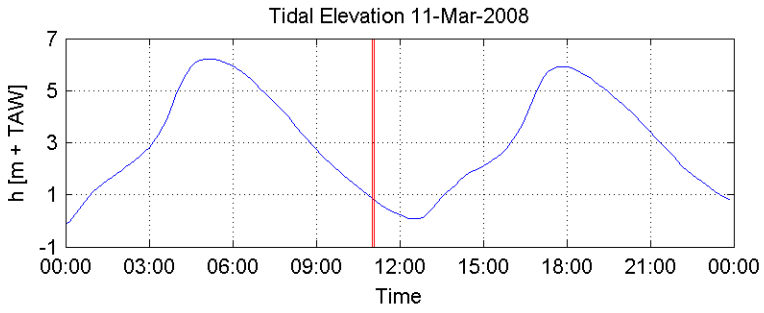
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3025Ktrl_sub.csv	Location: Transect K









HW/LW: 05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

11:00 - 11:05

Time after HW [HH:MM]

6:02

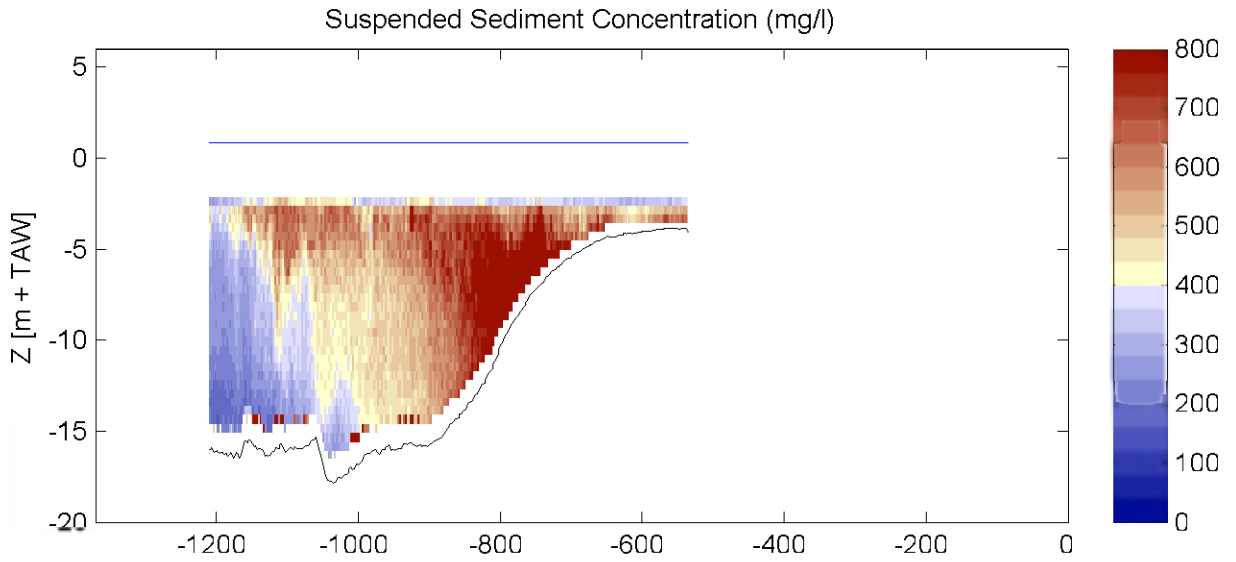
Data Processed by: IMDC

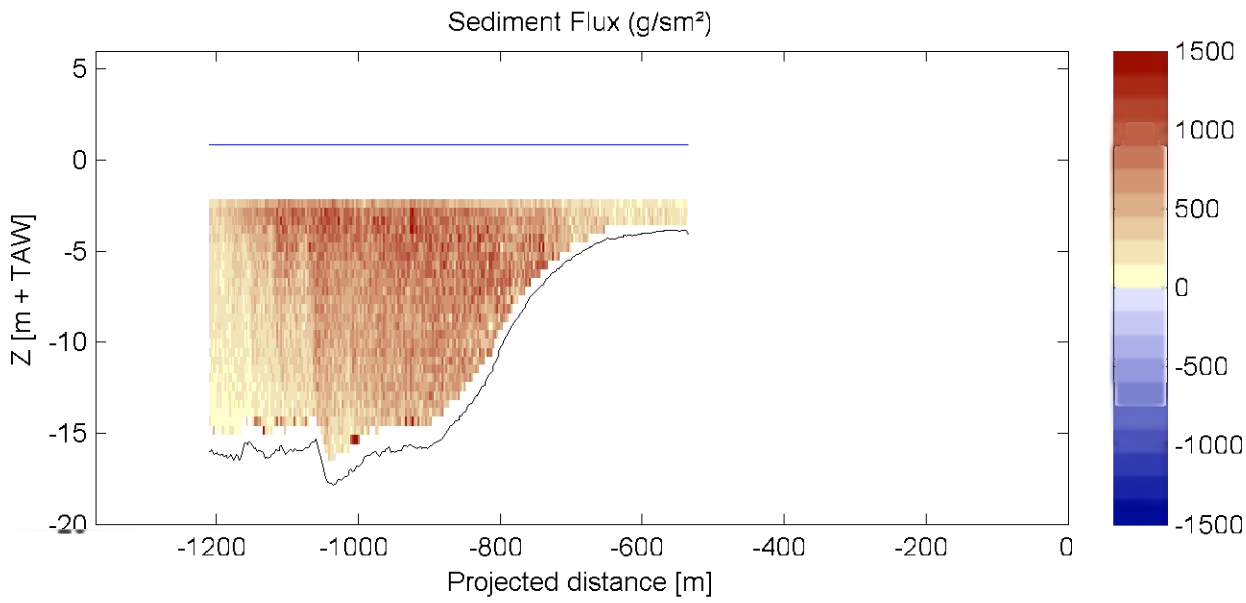
In association with : WL | delft hydraulics, GEMS International

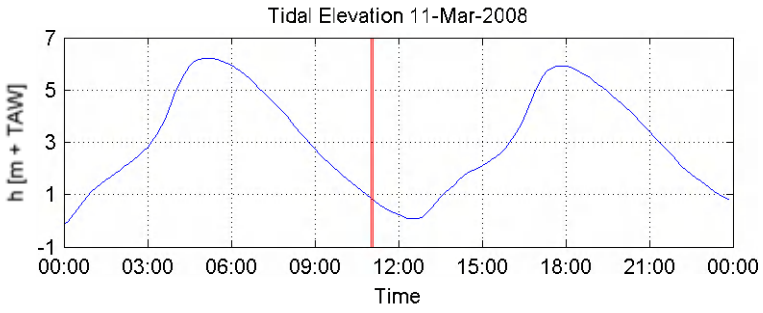
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3025Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

11:00 - 11:05

Time after HW [HH:MM]

6:02

Data Processed by: IMDC

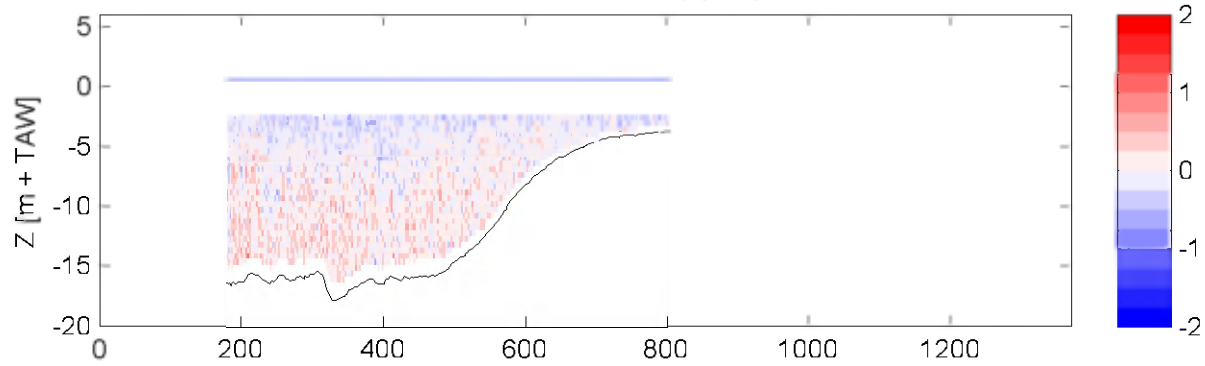
In association with :

I/RA/11283/07.089/MSA

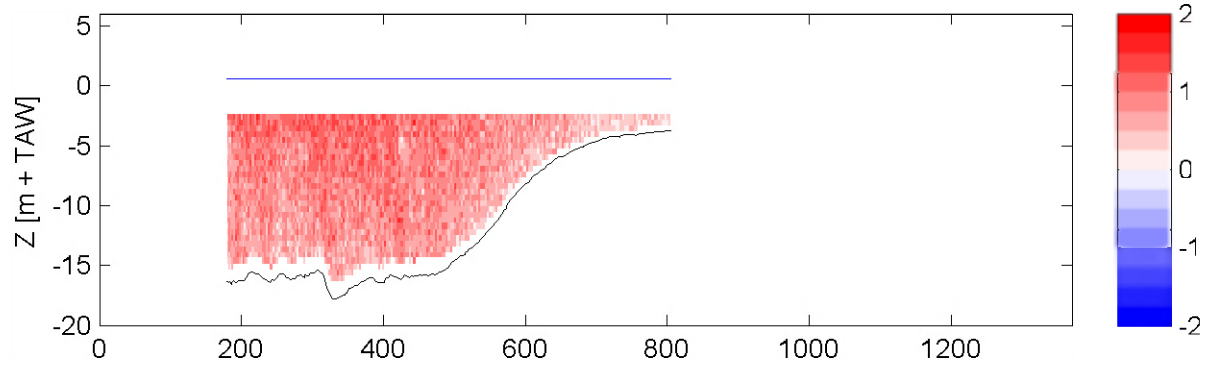
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3027Ktlr_sub.csv	Location: Transect K

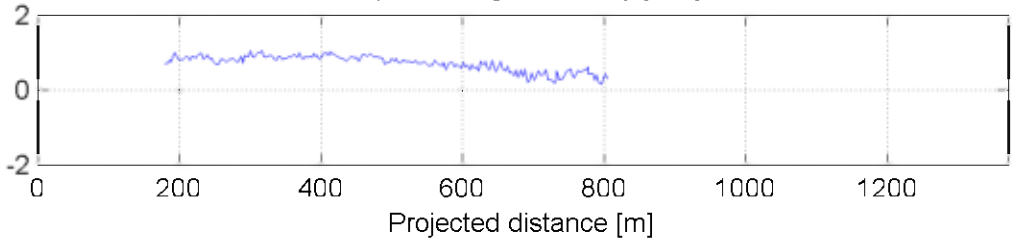
Parallel Current Velocity [m/s]



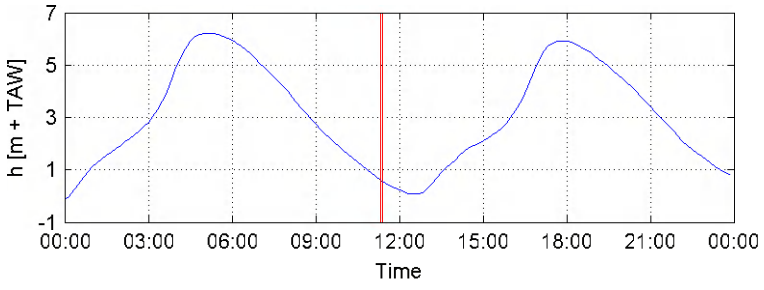
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
11:19 - 11:23

Time after HW [HH:MM]
6:21

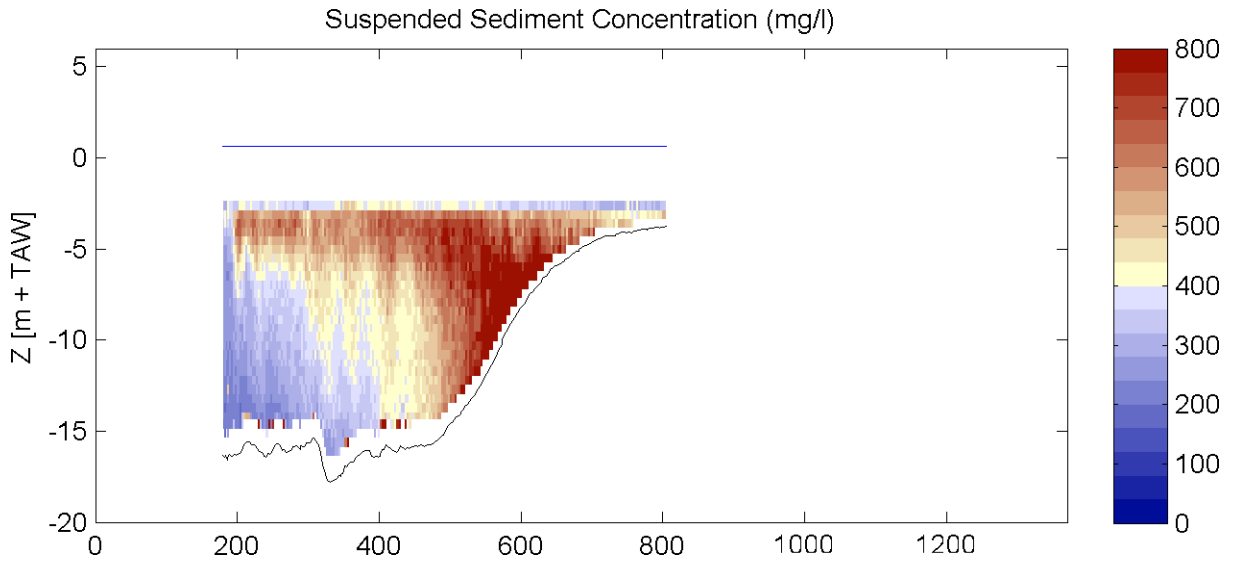
Data Processed by: IMDC

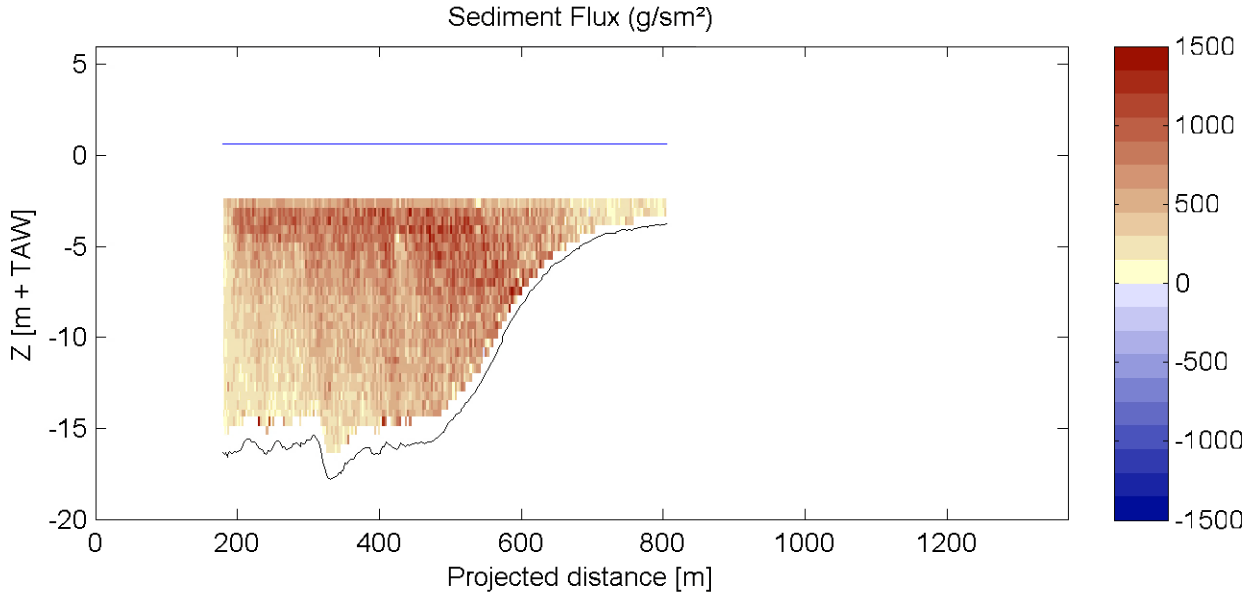
In association with :

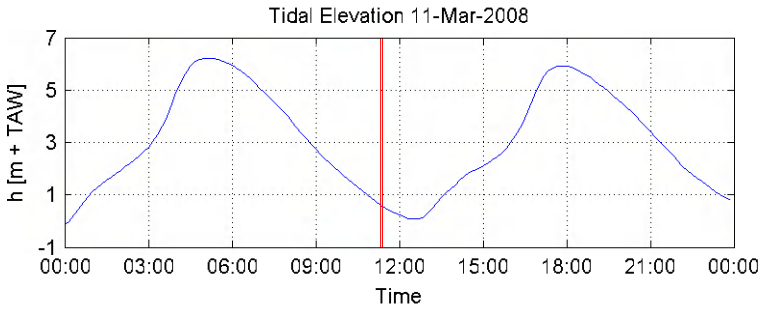
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3027Ktlr_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

11:19 - 11:23

Time after HW [HH:MM]

6:21

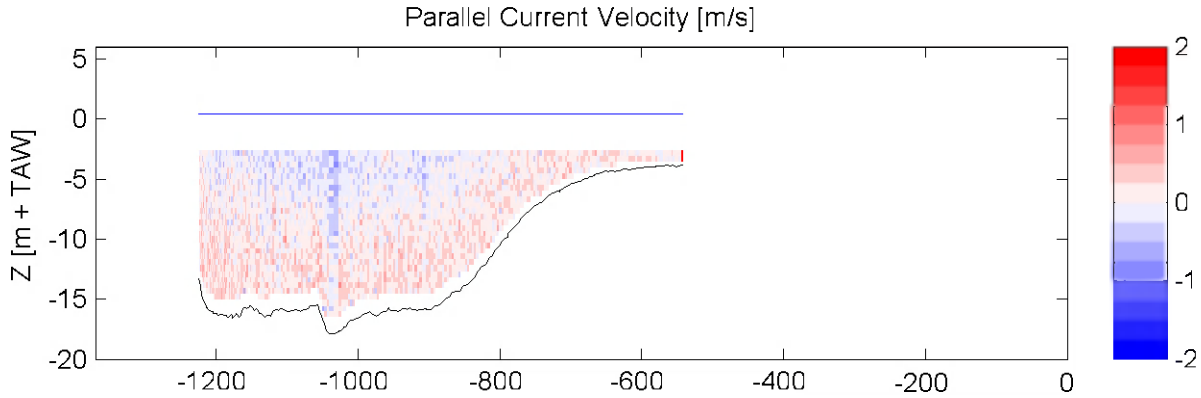
Data Processed by: IMDC

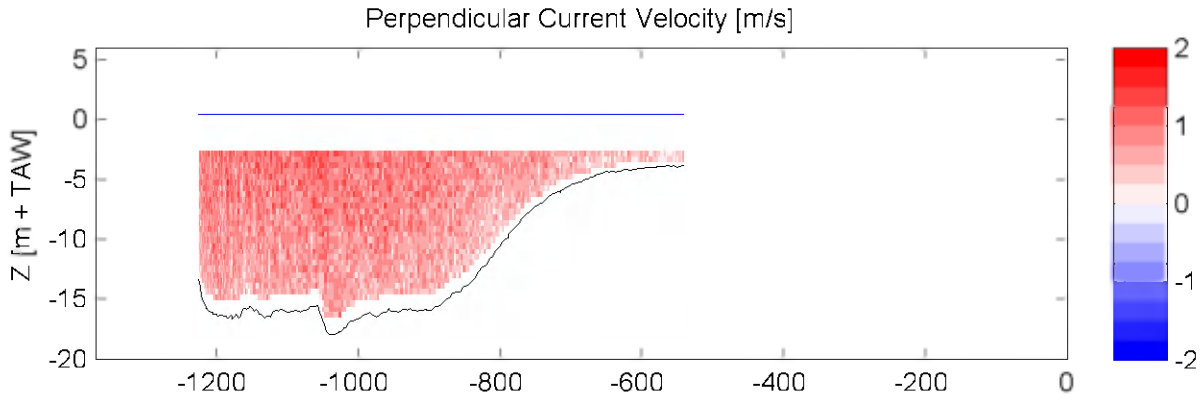
In association with :

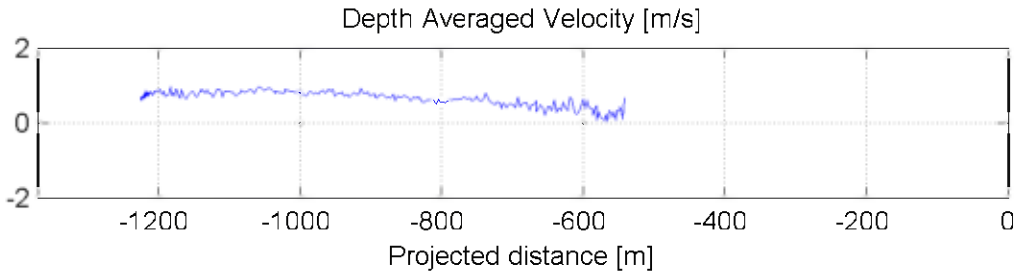
I/RA/11283/07.089/MSA

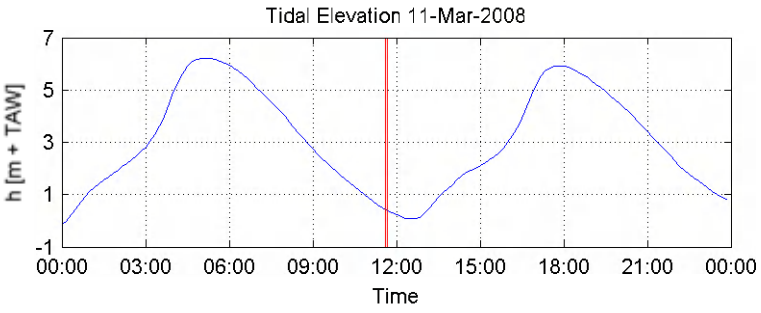
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3029Ktrl_sub.csv	Location: Transect K









HW/LW: 05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

11:35 - 11:39

Time after HW [HH:MM]

6:37

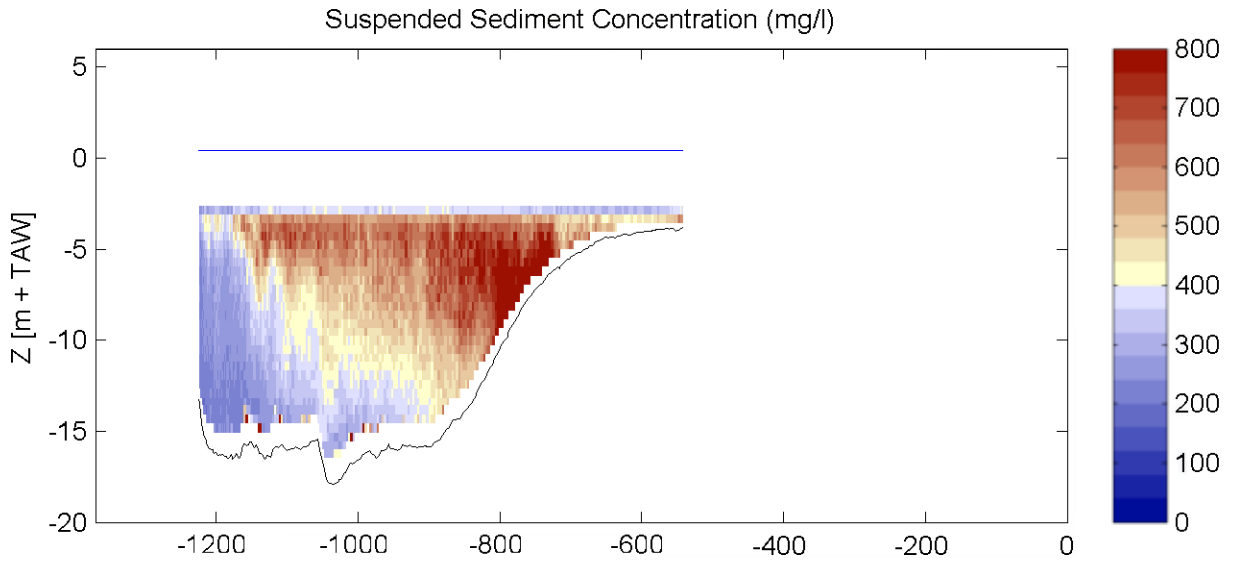
Data Processed by: IMDC

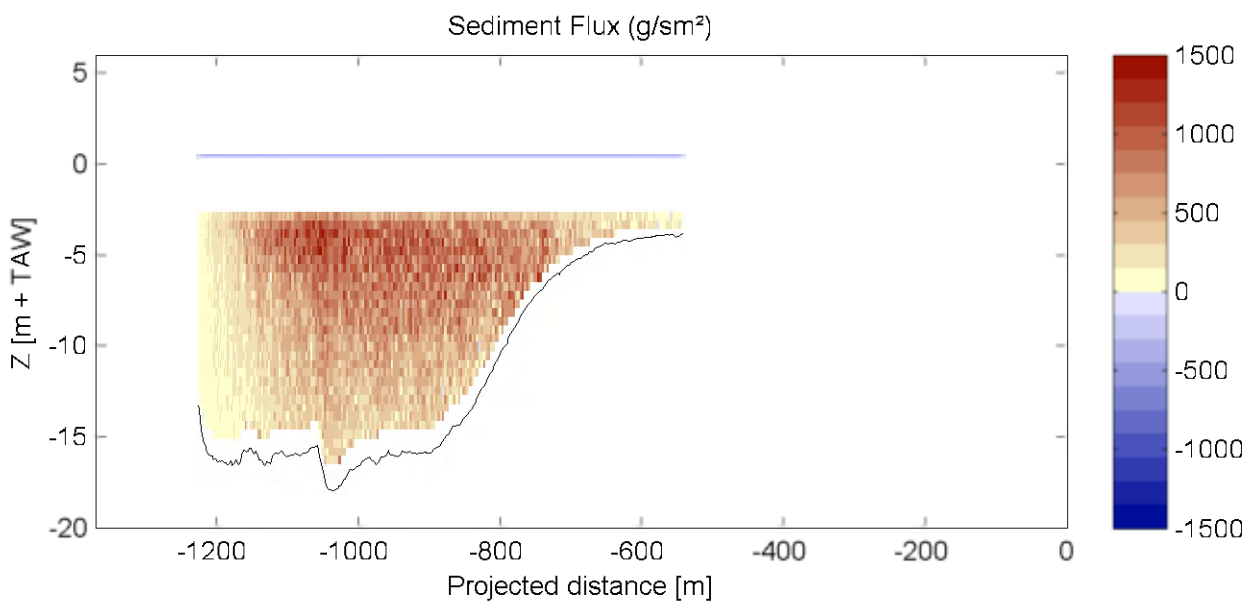
In association with :

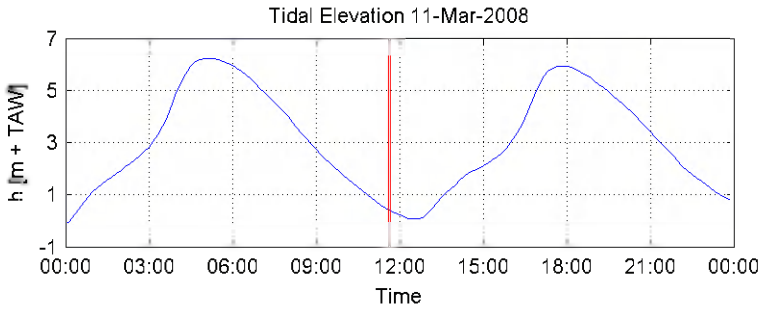
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3029Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

11:35 - 11:39

Time after HW [HH:MM]

6:37

Data Processed by: IMDC

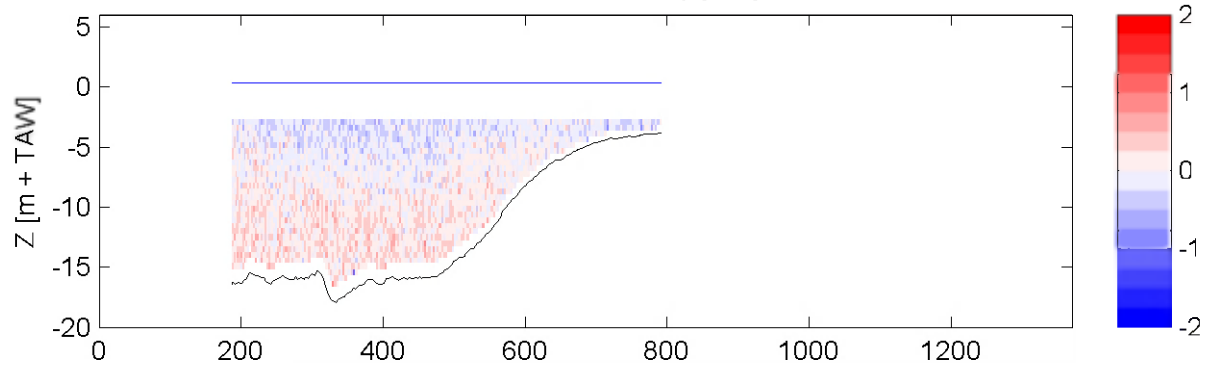
In association with :

I/RA/11283/07.089/MSA

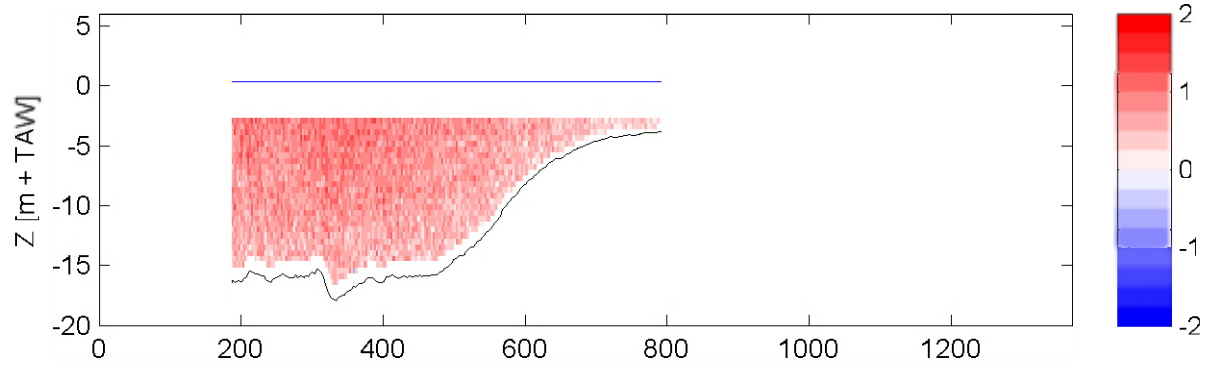
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3031Ktlr_sub.csv	Location: Transect K

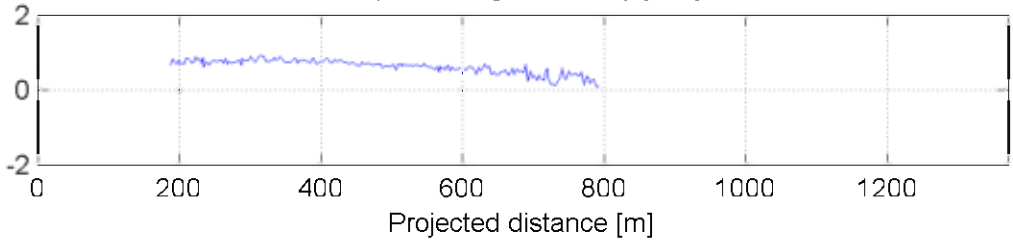
Parallel Current Velocity [m/s]



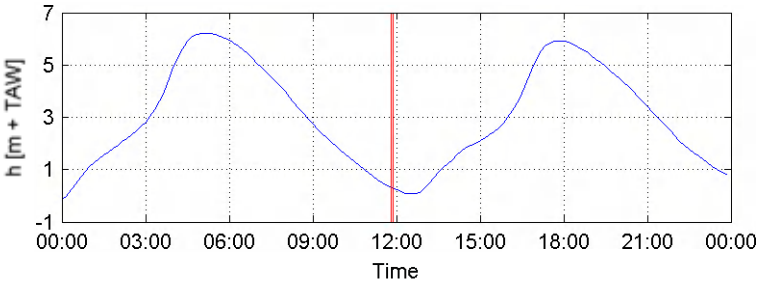
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
11:49 - 11:52

Time after HW [HH:MM]
6:51

Data Processed by: IMDC

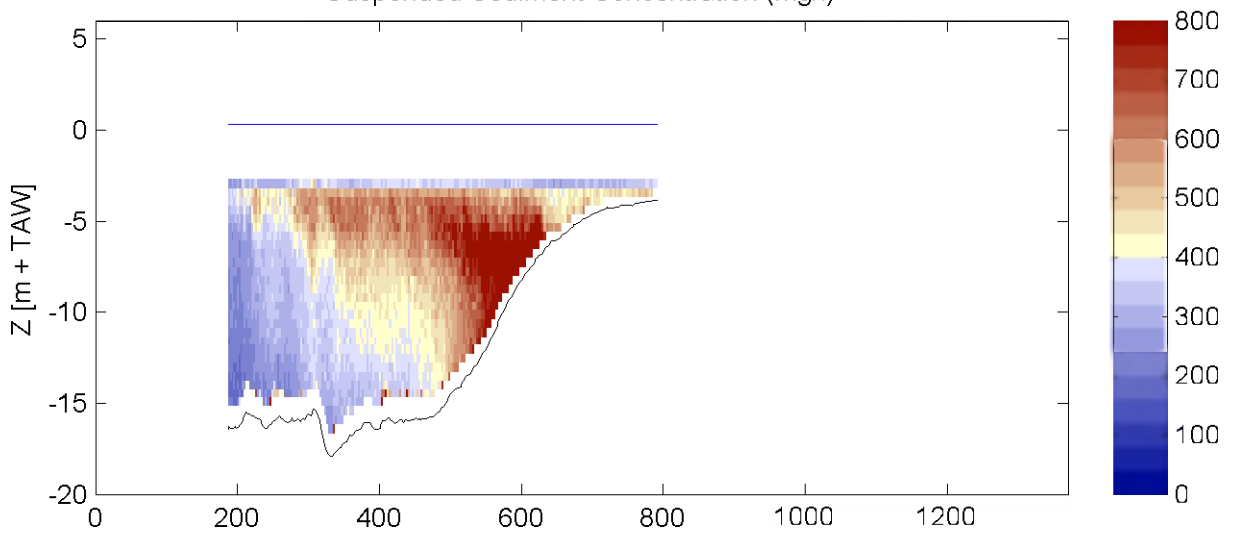
In association with :

I/RA/11283/07.089/MSA

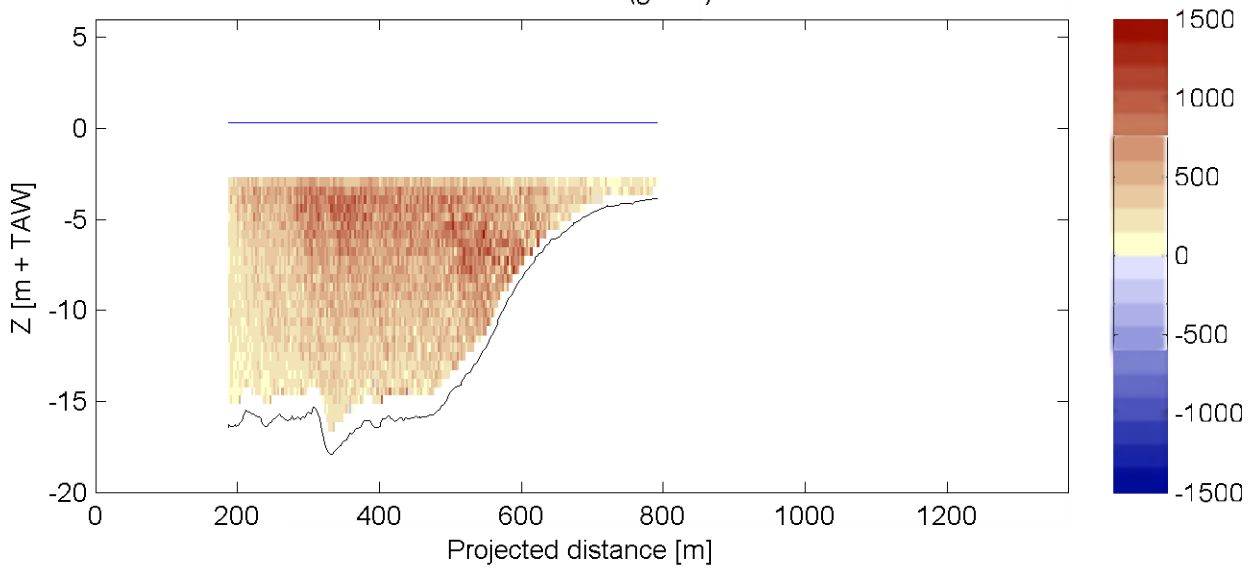
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3031Ktlr_sub.csv	Location: Transect K

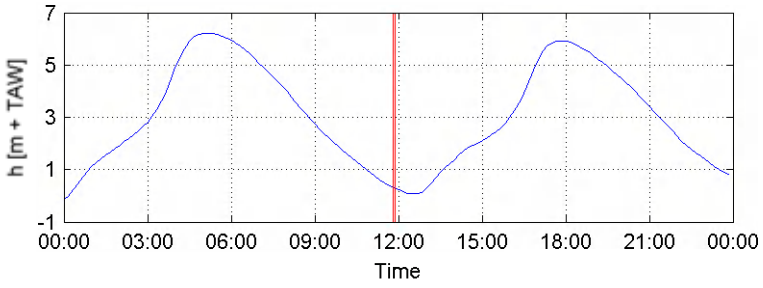
Suspended Sediment Concentration (mg/l)



Sediment Flux (g/sm²)



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
11:49 - 11:52

Time after HW [HH:MM]
6:51

Data Processed by: IMDC

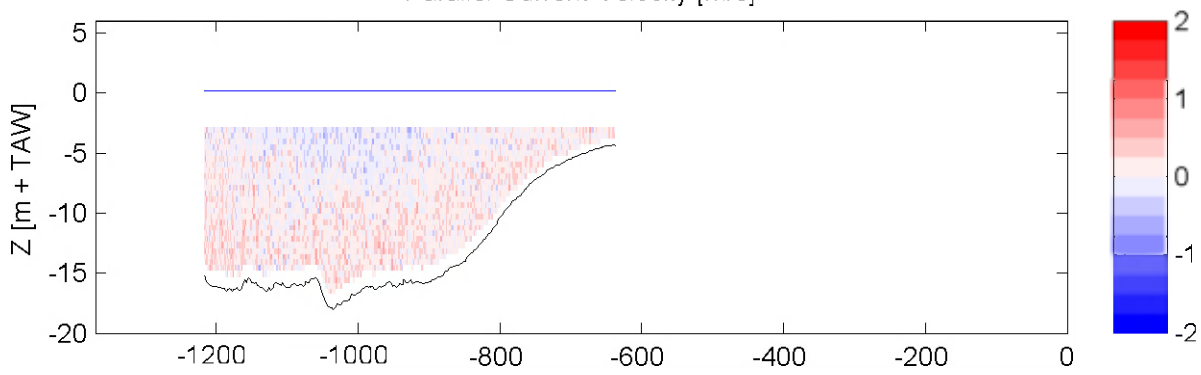
In association with :

I/RA/11283/07.089/MSA

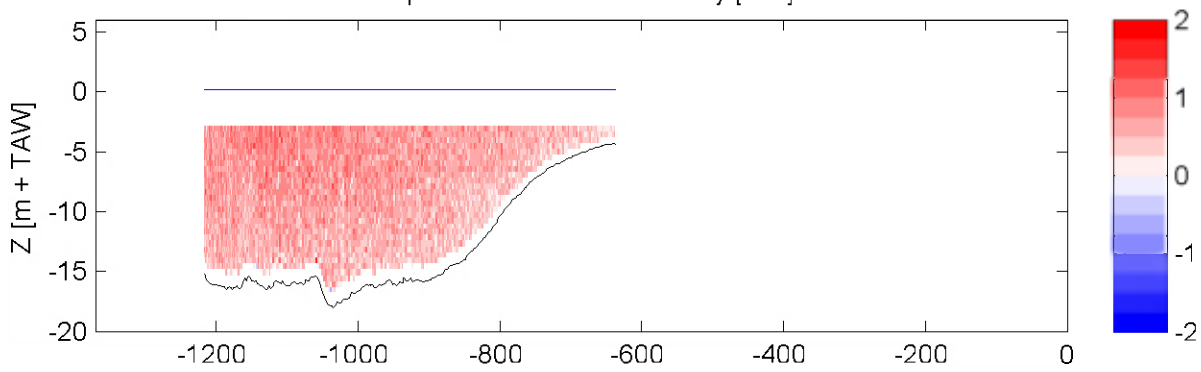
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3033Ktrl_sub.csv	Location: Transect K

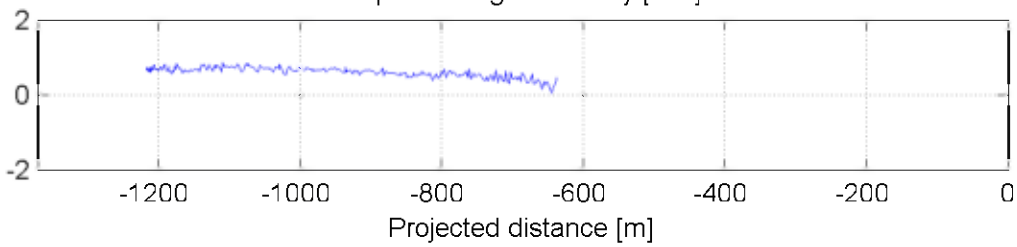
Parallel Current Velocity [m/s]



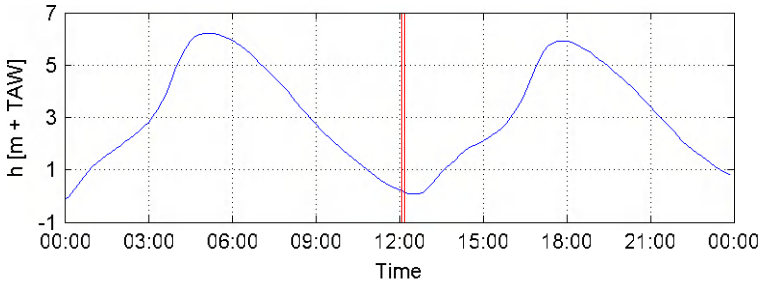
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
12:05 - 12:10

Time after HW [HH:MM]
7:08

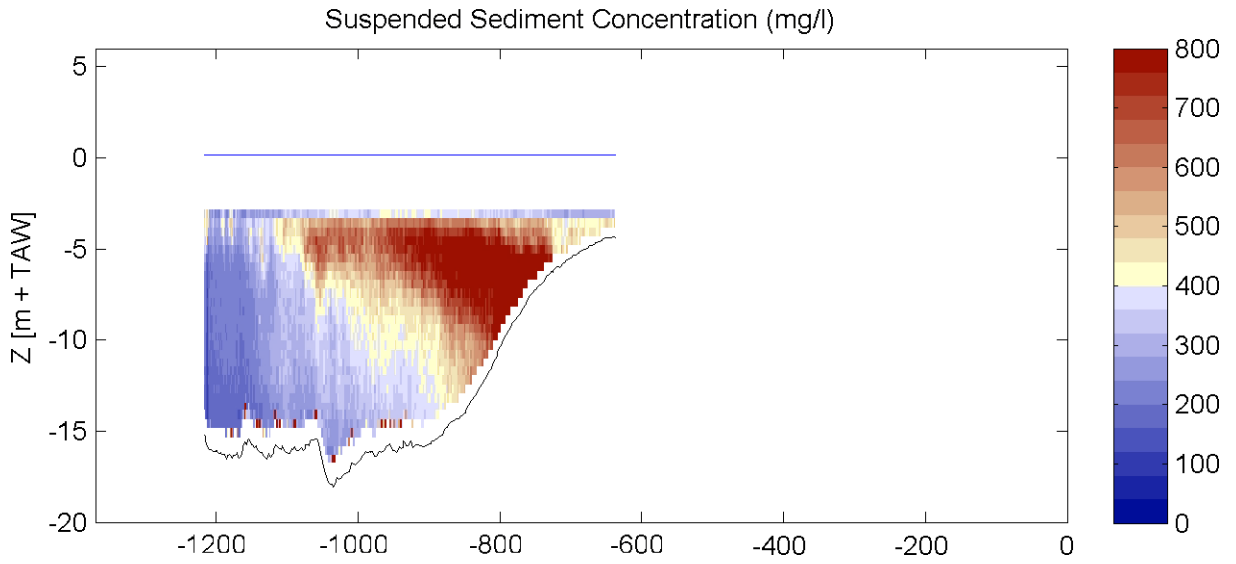
Data Processed by: IMDC

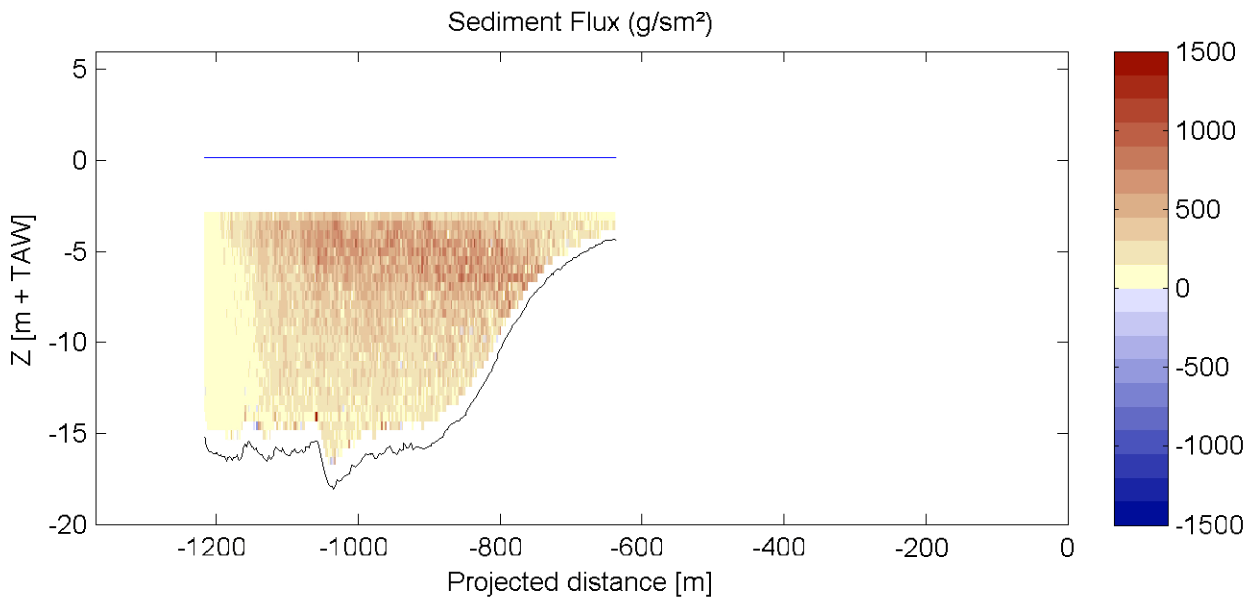
In association with :

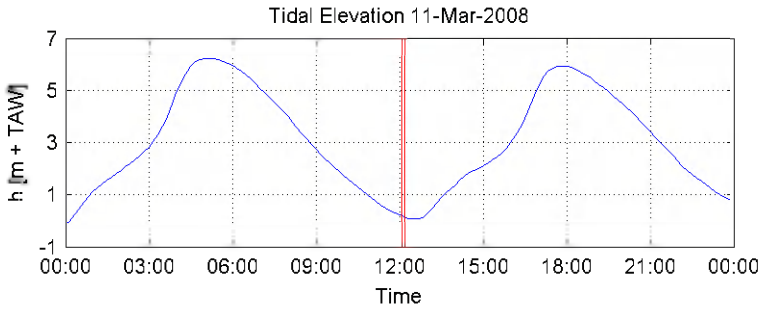
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3033Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

12:05 - 12:10

Time after HW [HH:MM]

7:08

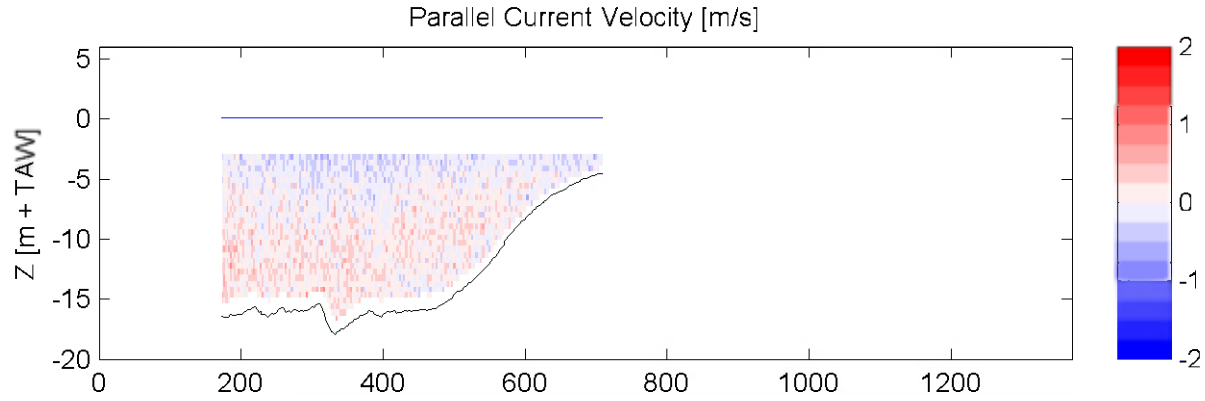
Data Processed by: IMDC

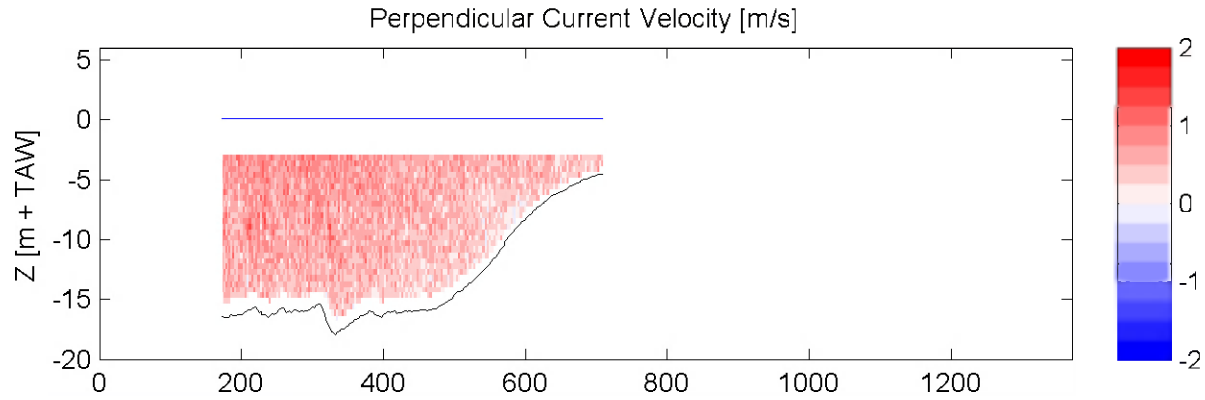
In association with : WL | delft hydraulics, GEMS

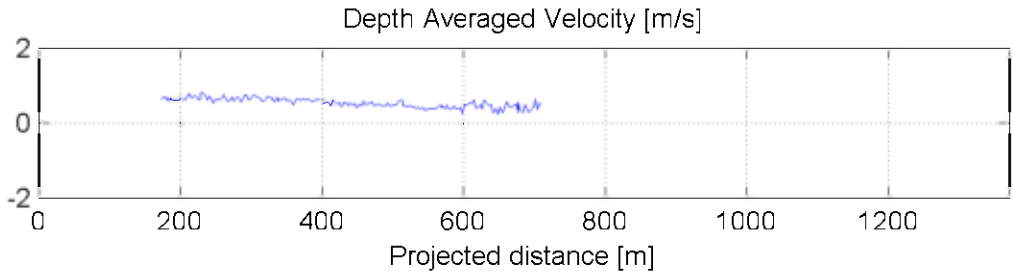
I/RA/11283/07.089/MSA

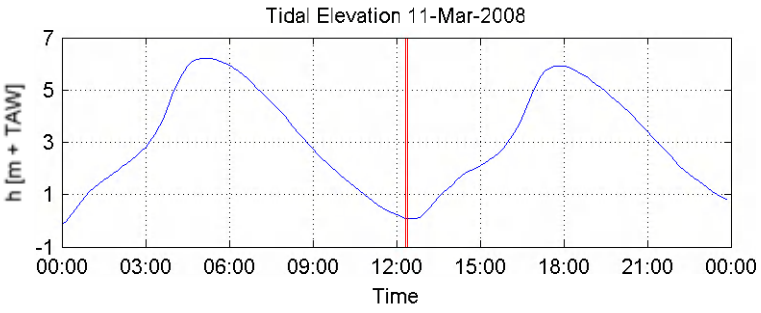
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3035Ktlr_sub.csv	Location: Transect K









HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

12:19 - 12:22

Time after HW [HH:MM]

7:21

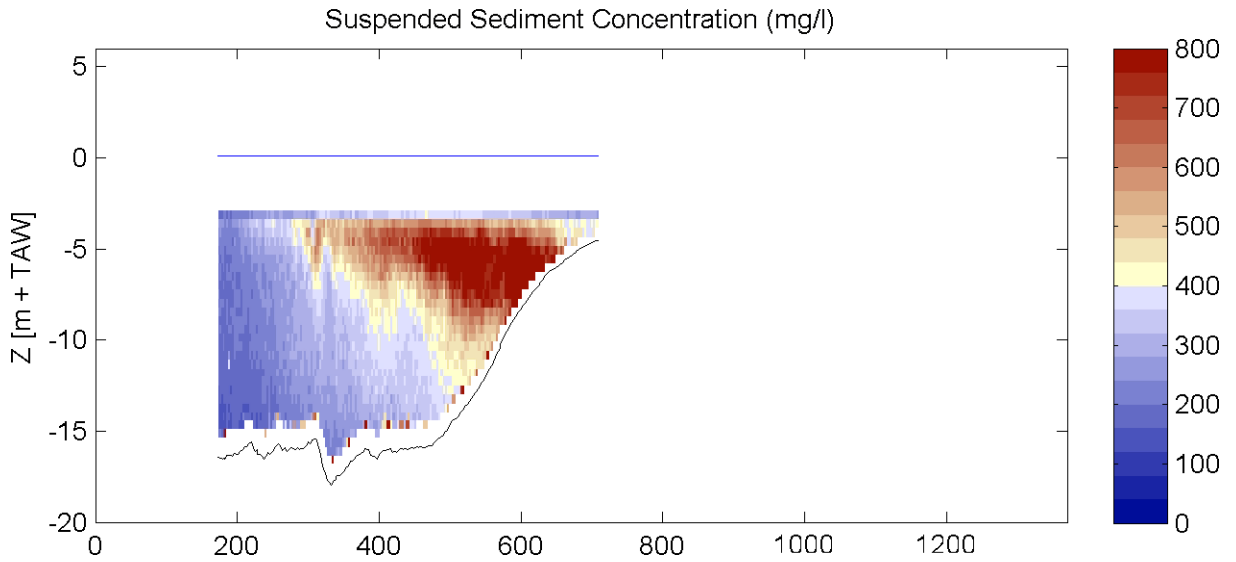
Data Processed by: IMDC

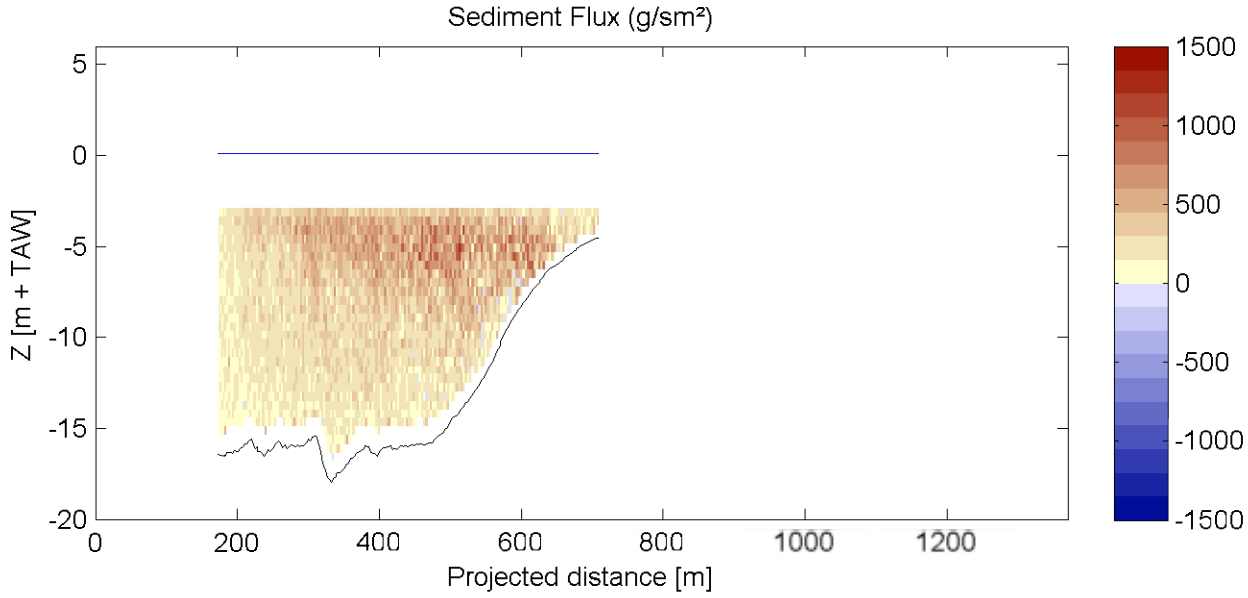
In association with :

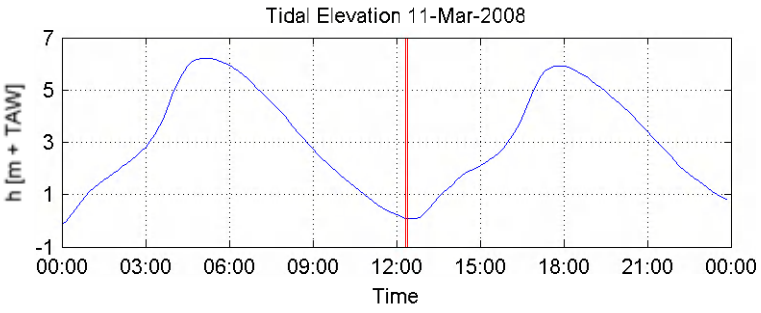
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3035Ktlr_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

12:19 - 12:22

Time after HW [HH:MM]

7:21

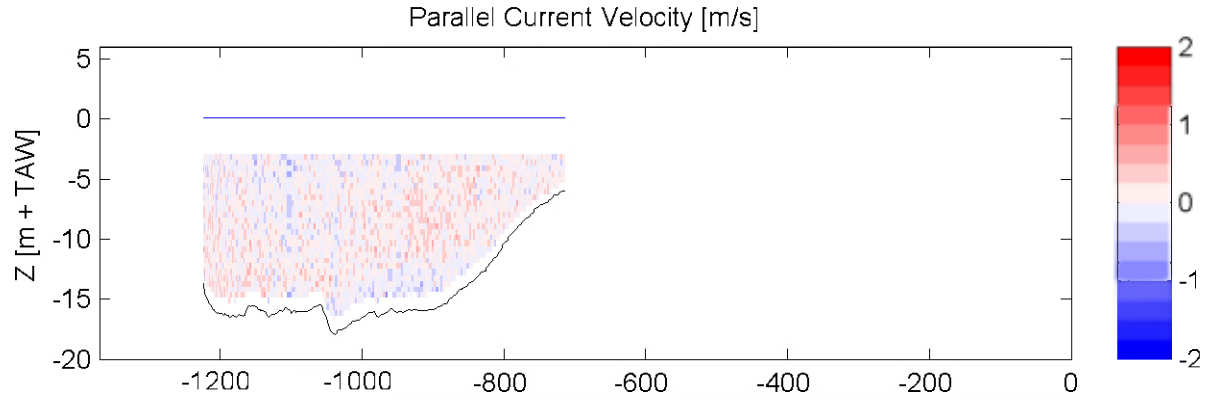
Data Processed by: IMDC

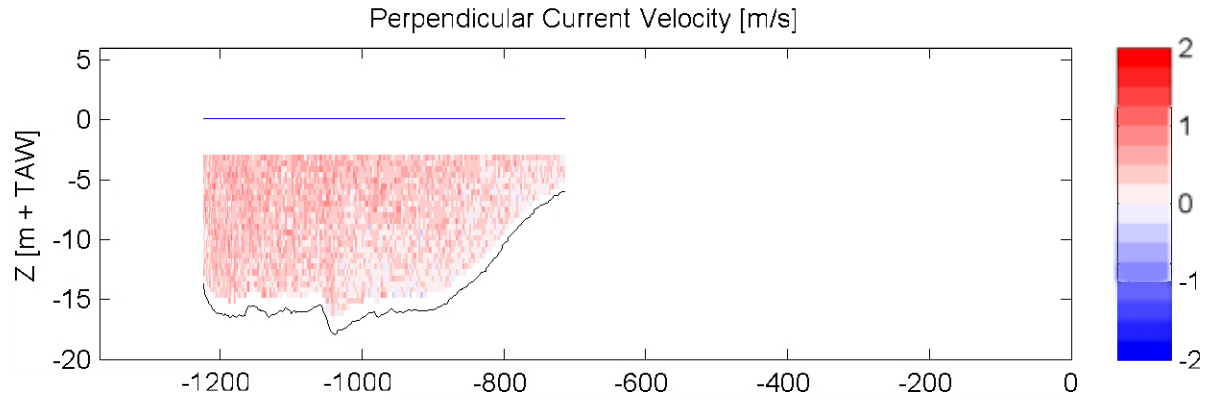
In association with :

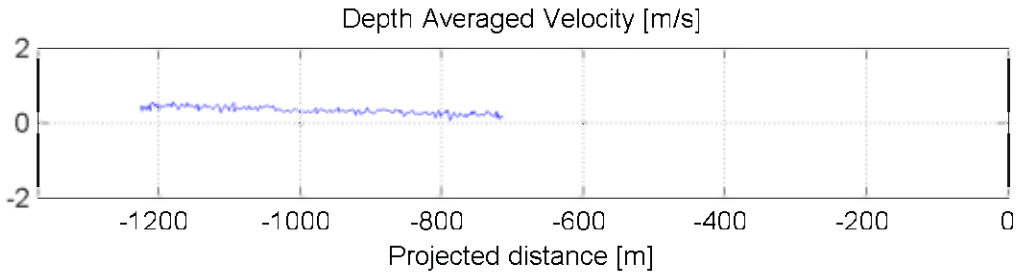
I/RA/11283/07.089/MSA

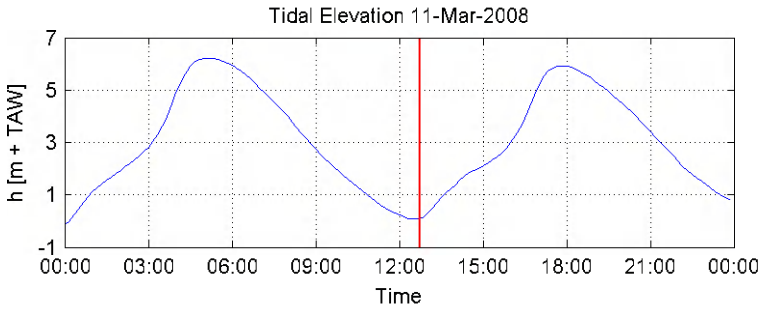
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3037Ktrl_sub.csv	Location: Transect K









HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
12:42 - 12:45

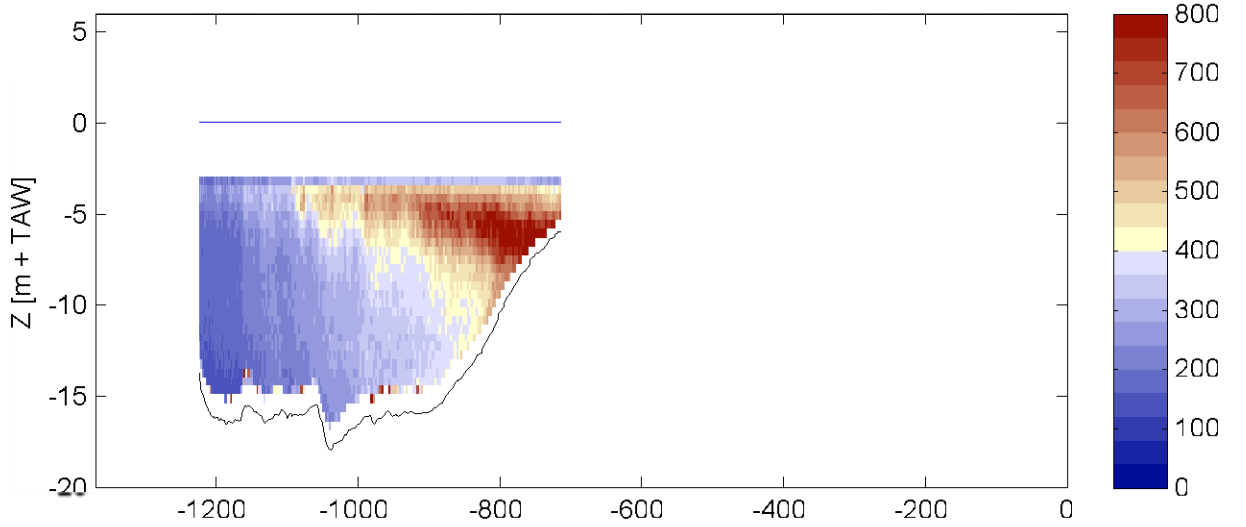
Time after HW [HH:MM]
-5:06

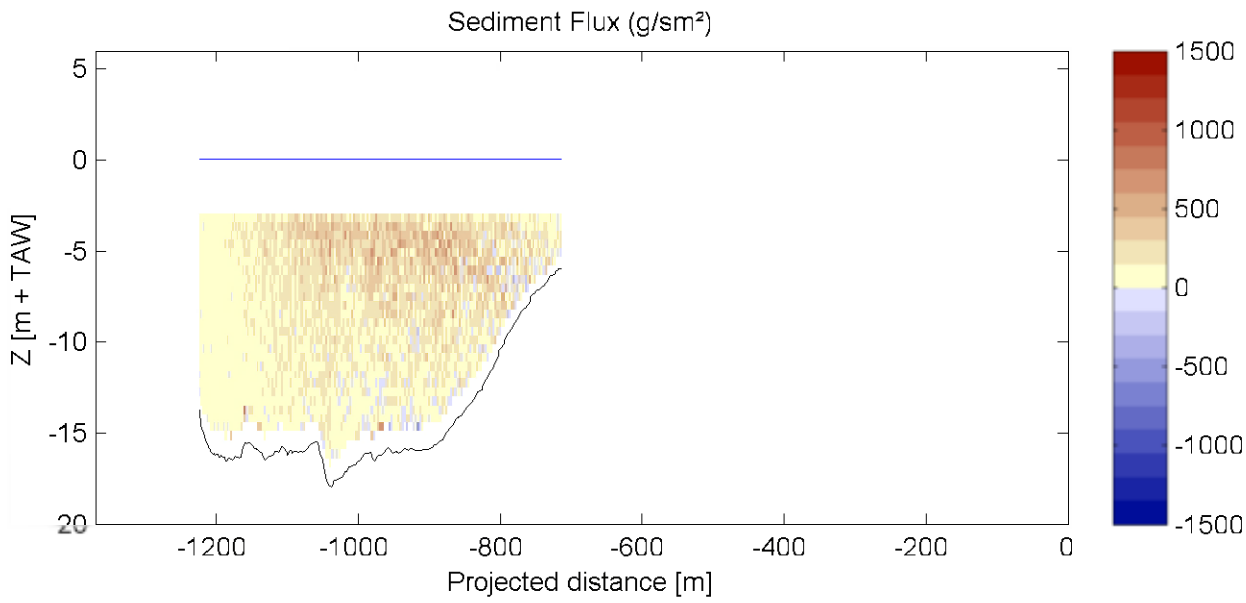
Data Processed by: IMDC
In association with :

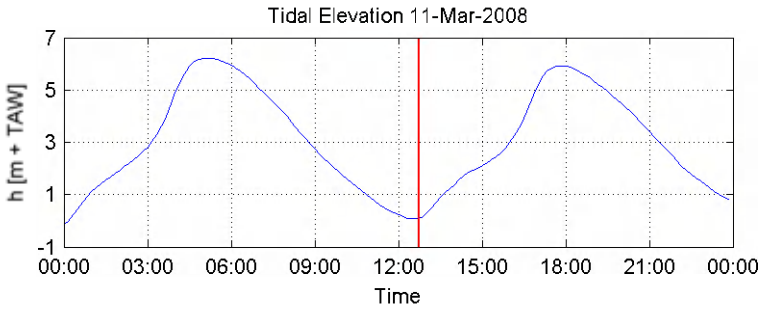
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3037Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
12:42 - 12:45

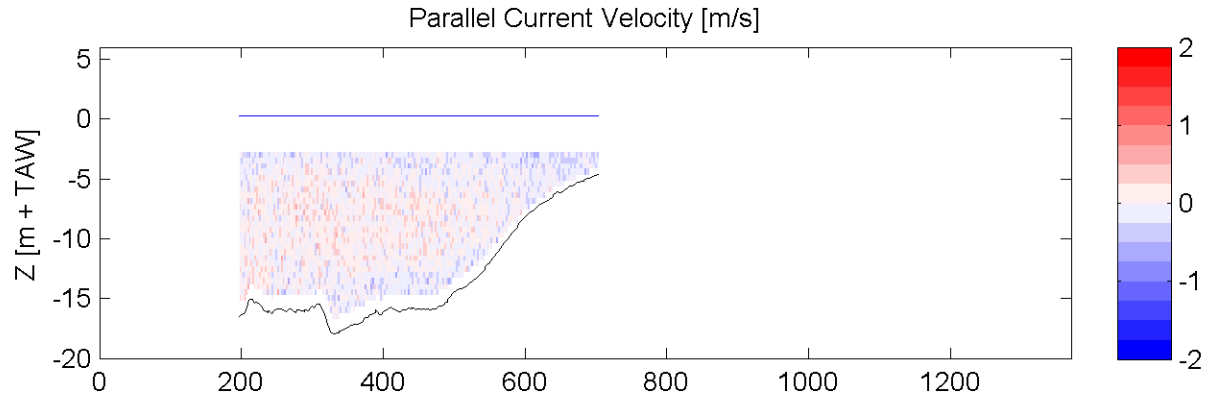
Time after HW [HH:MM]
-5:06

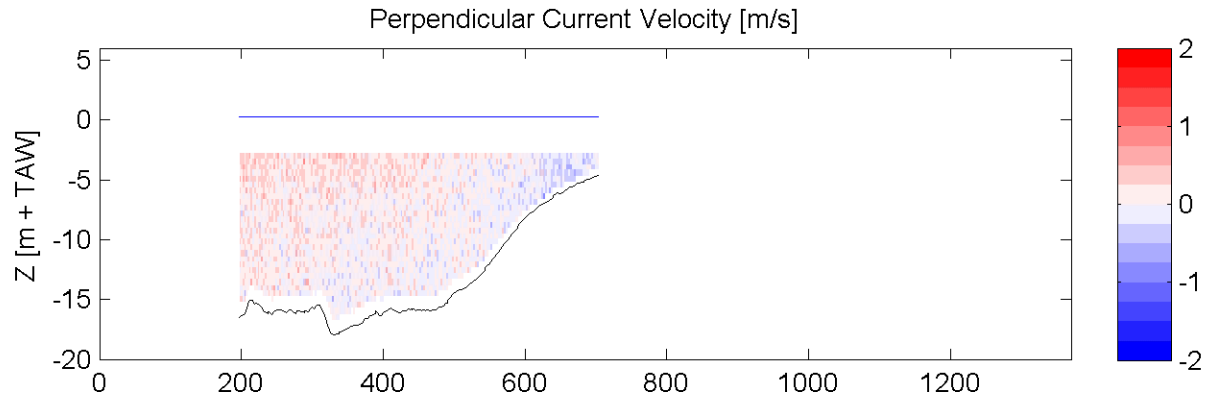
Data Processed by: IMDC
In association with :

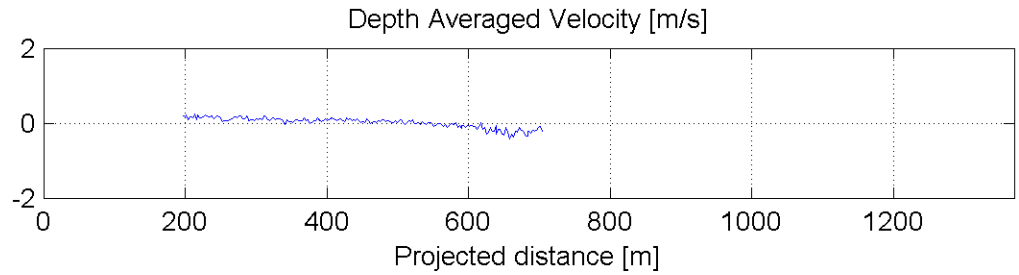
I/RA/11283/07.089/MSA

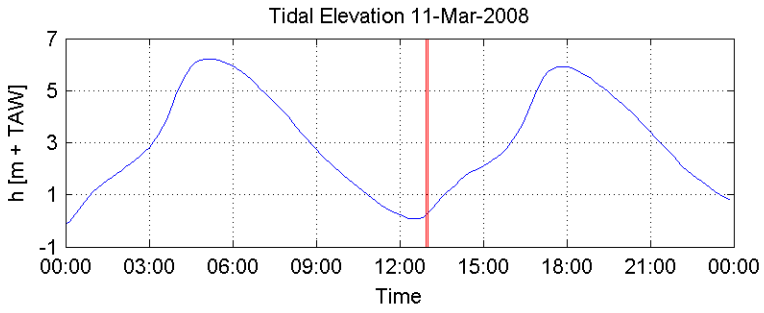
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3039Ktlr_sub.csv	Location: Transect K









HW/LW: 05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

12:57 - 13:00

Time after HW [HH:MM]

-4:51

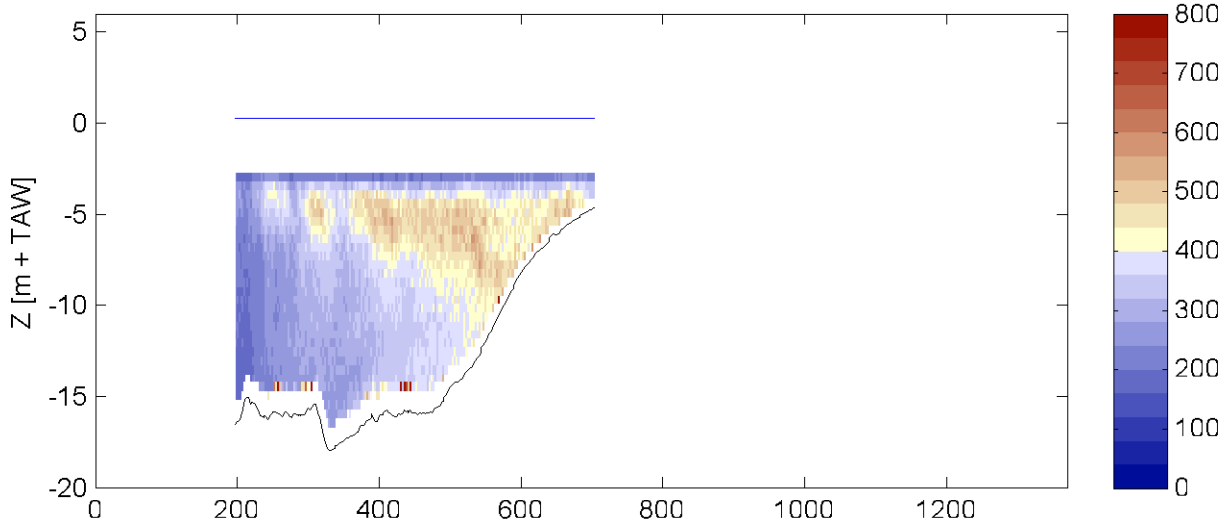
Data Processed by: IMDC

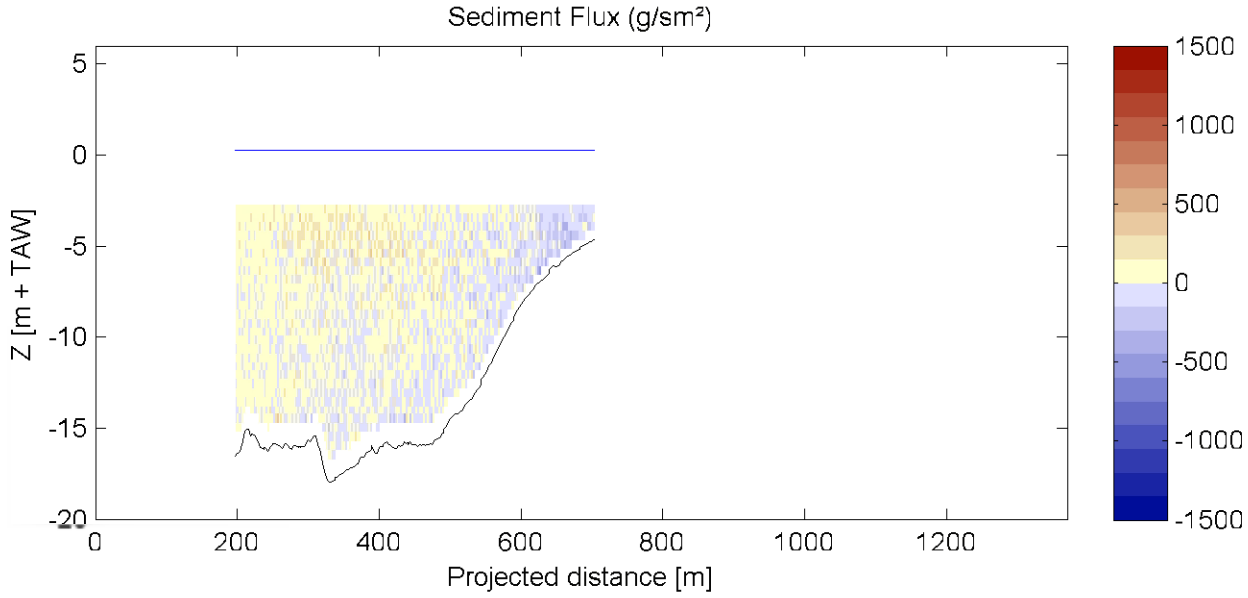
In association with : WL | delft hydraulics, GEMS International

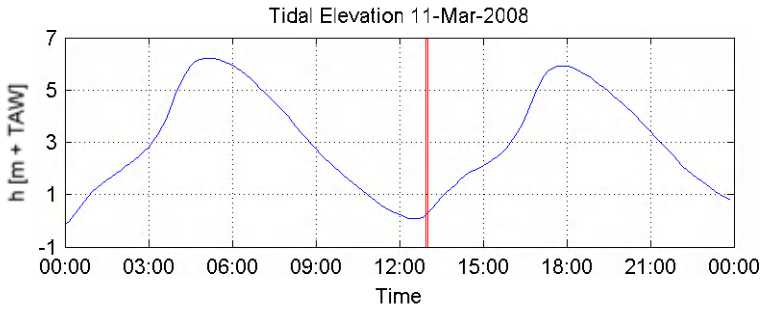
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3039Ktlr_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

12:57 - 13:00

Time after HW [HH:MM]

-4:51

Data Processed by: IMDC

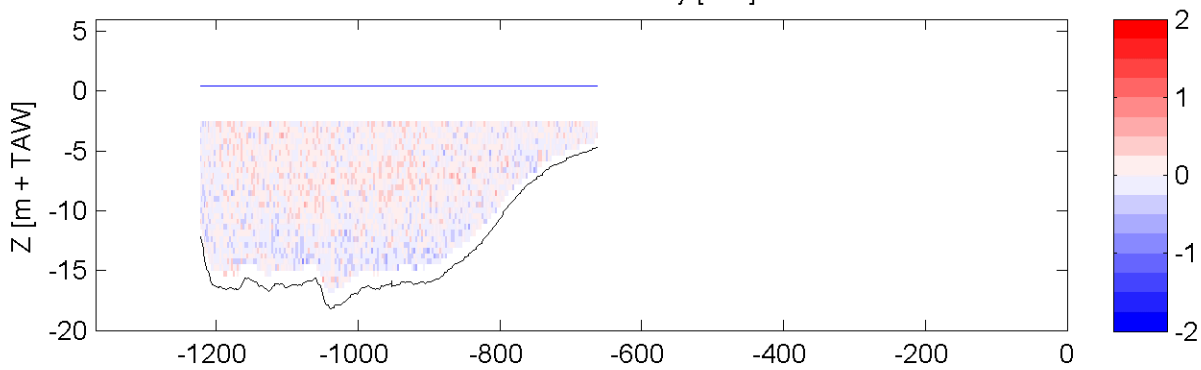
In association with :

I/RA/11283/07.089/MSA

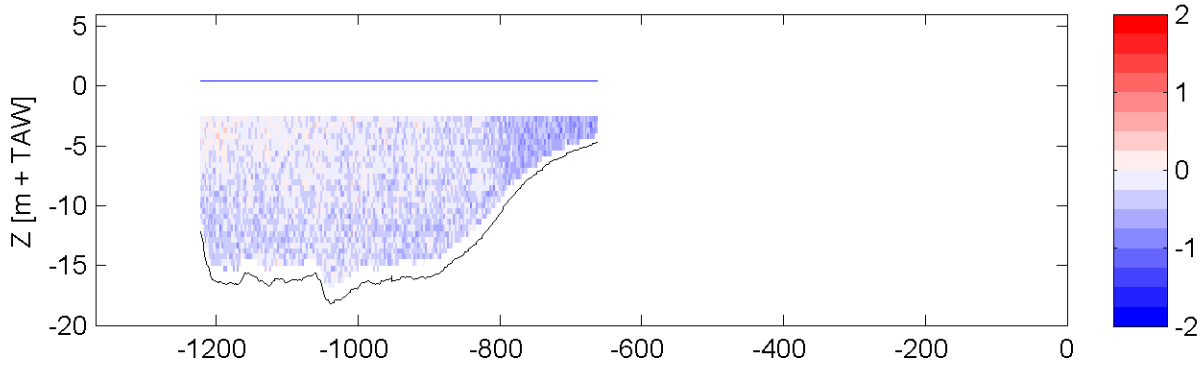
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3041Ktrl_sub.csv	Location: Transect K

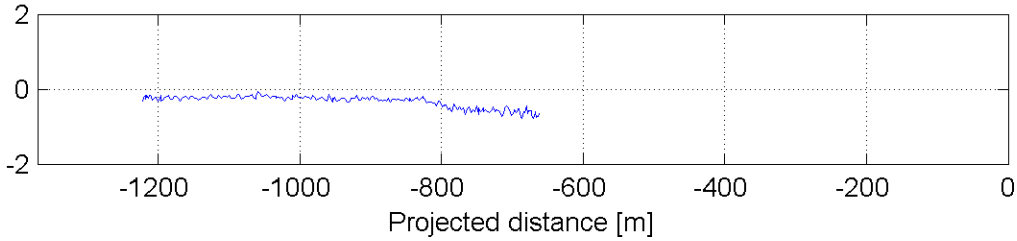
Parallel Current Velocity [m/s]



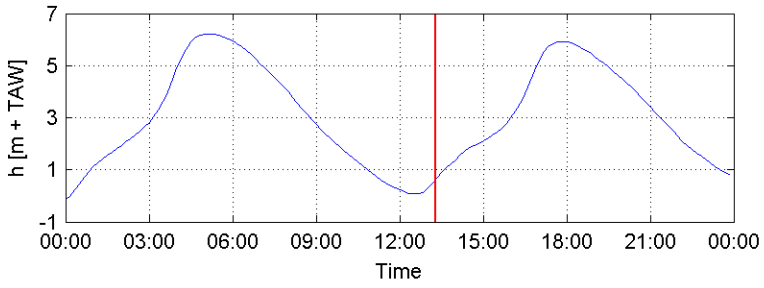
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW: 05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

13:14 - 13:18

Time after HW [HH:MM]

-4:33

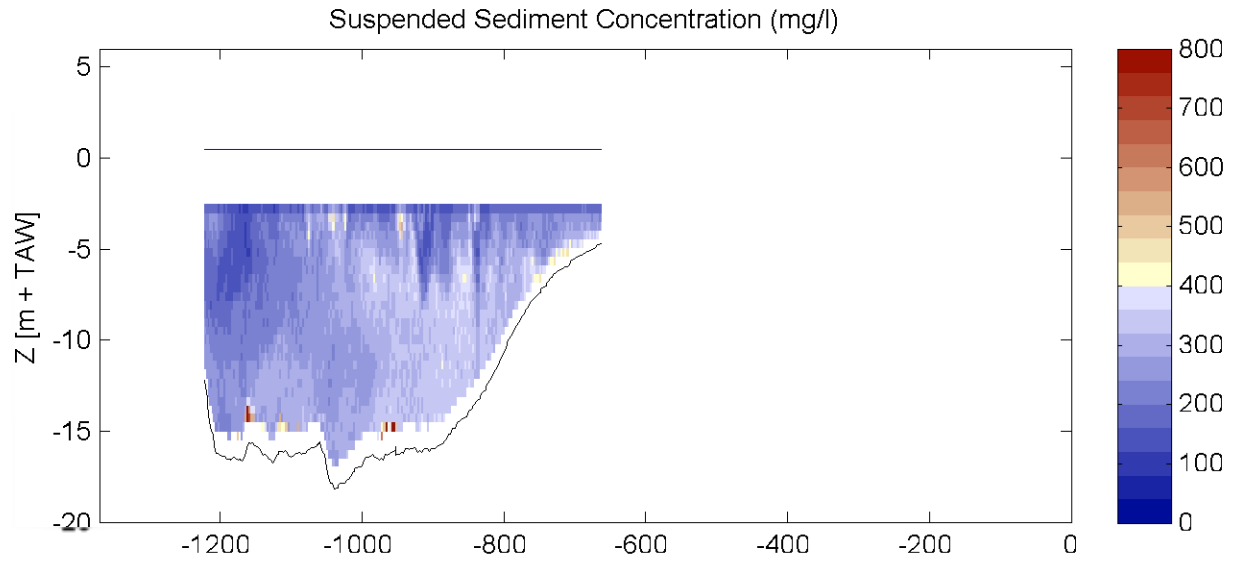
Data Processed by: IMDC

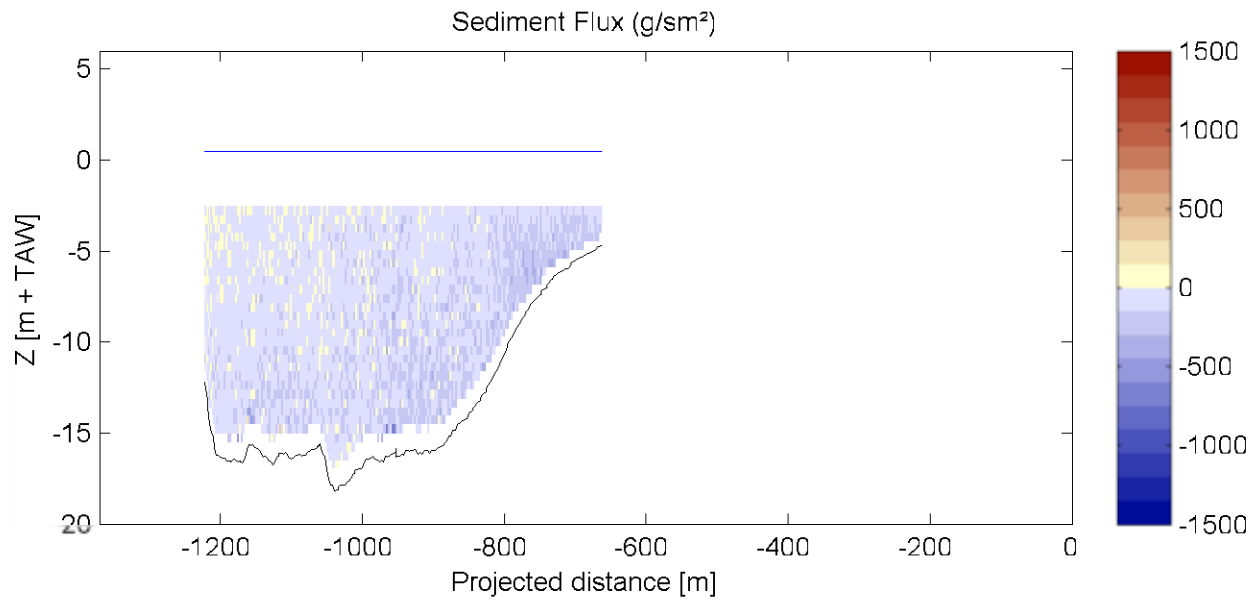
In association with : w.l | delft hydraulics, GEMS International

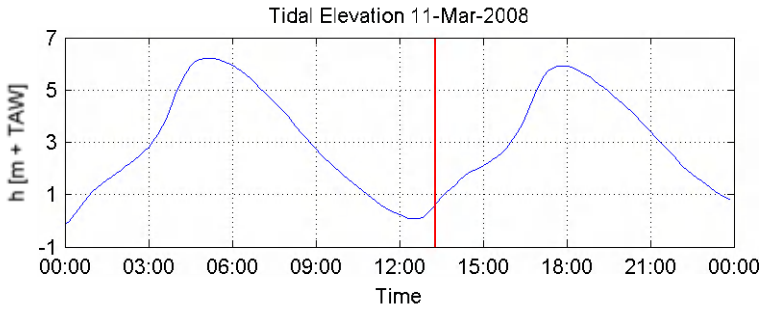
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3041Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
13:14 - 13:18

Time after HW [HH:MM]
-4:33

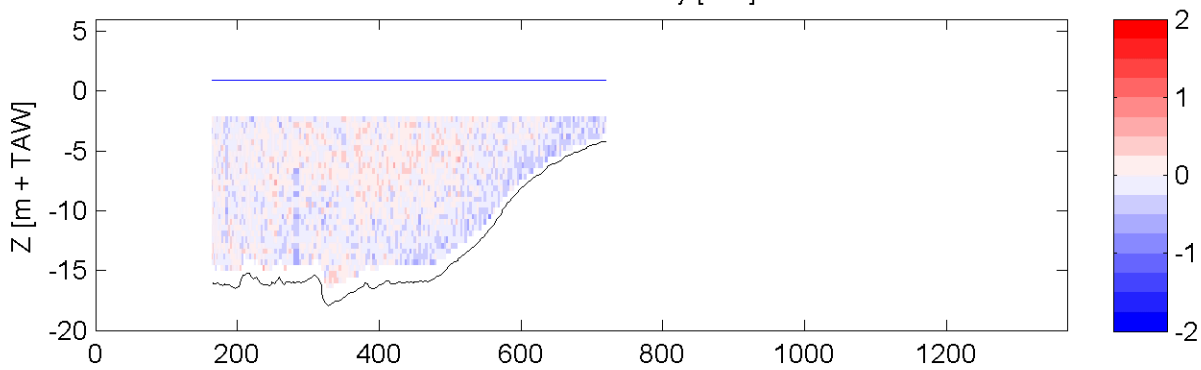
Data Processed by: IMDC
In association with :

I/RA/11283/07.089/MSA

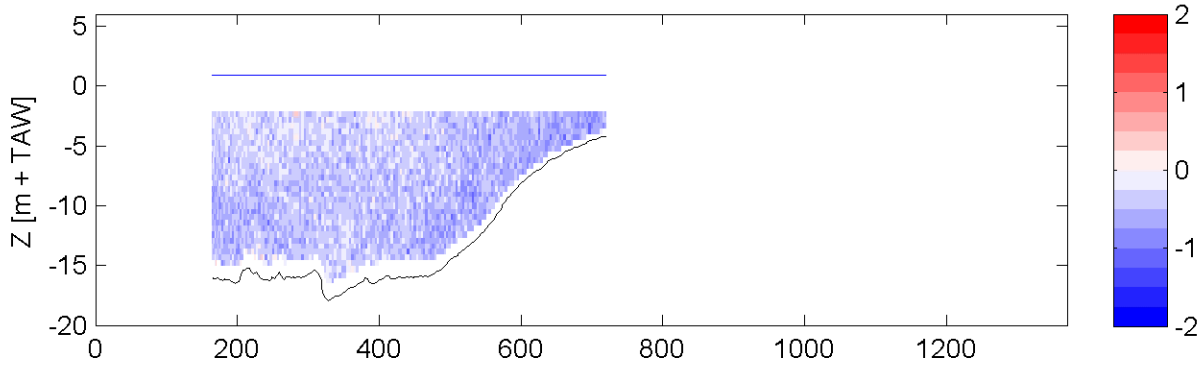
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3043Ktlr_sub.csv	Location: Transect K

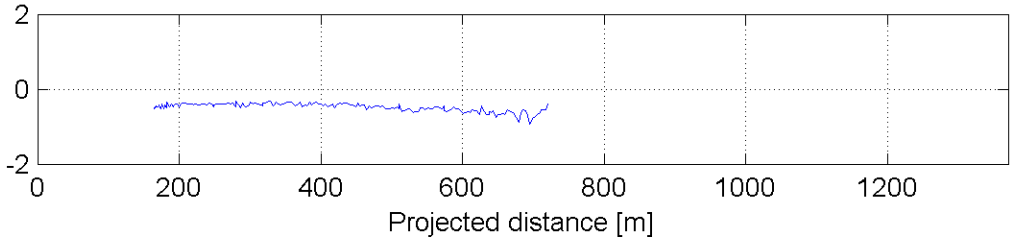
Parallel Current Velocity [m/s]



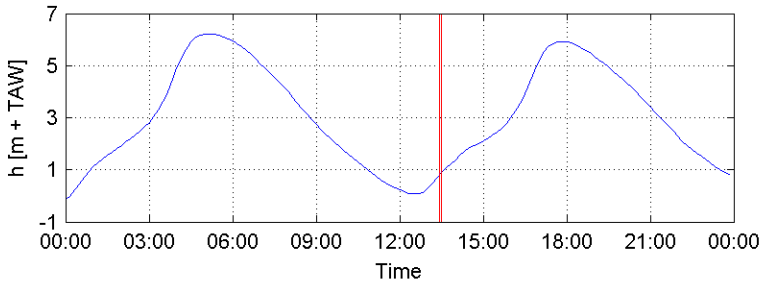
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

13:26 - 13:29

Time after HW [HH:MM]

-4:22

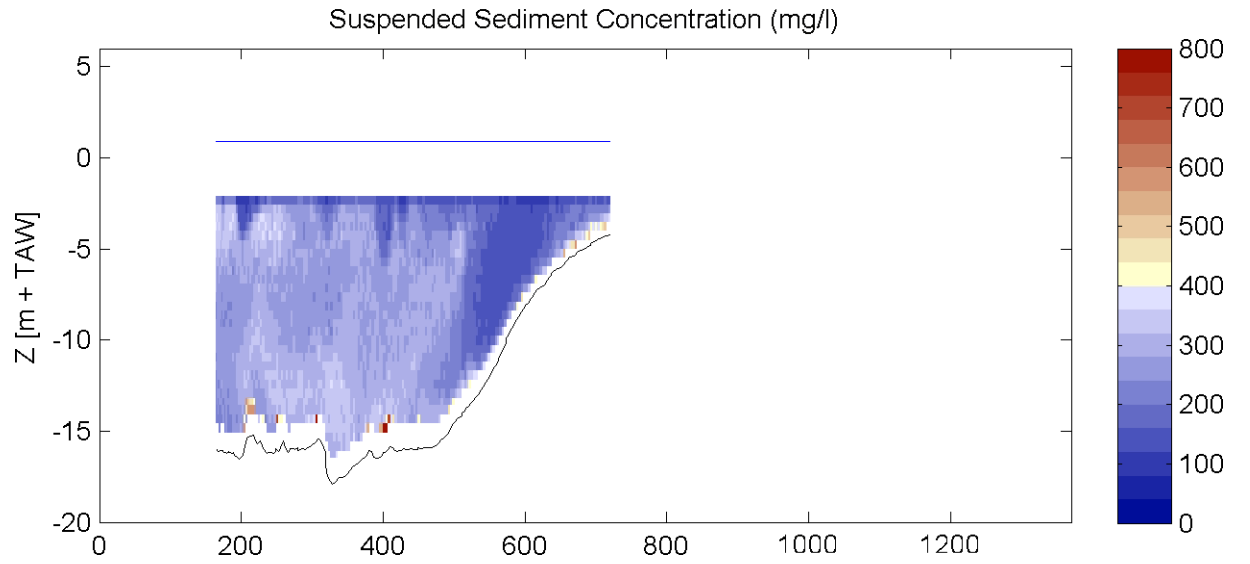
Data Processed by: IMDC

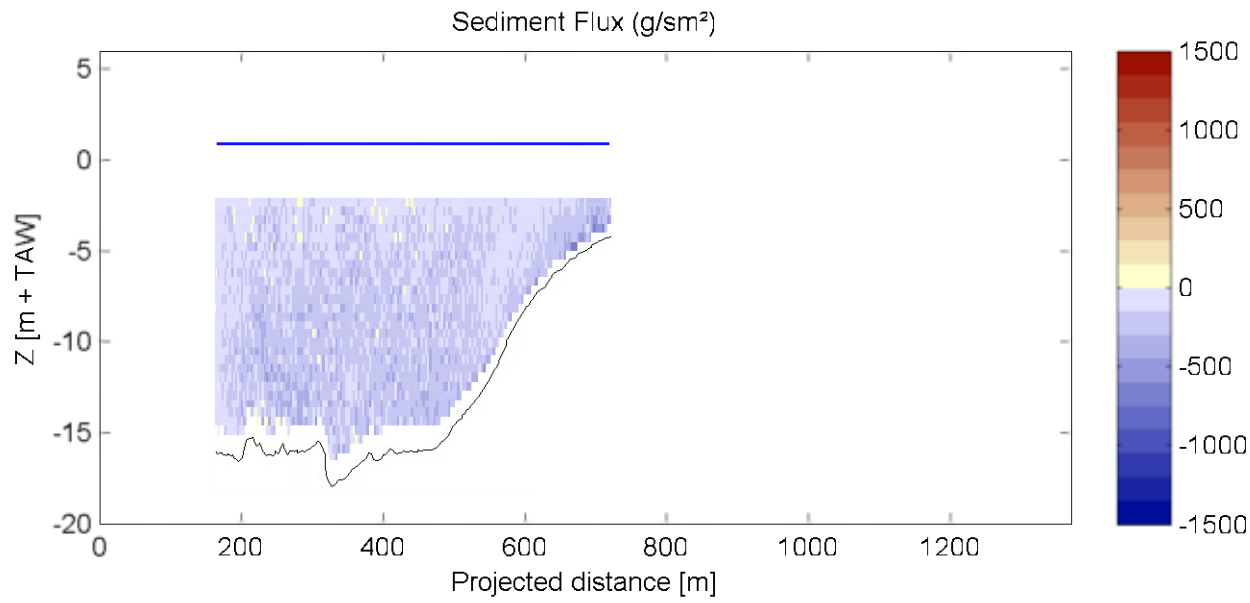
In association with : WL | delft hydraulics, GEMS International

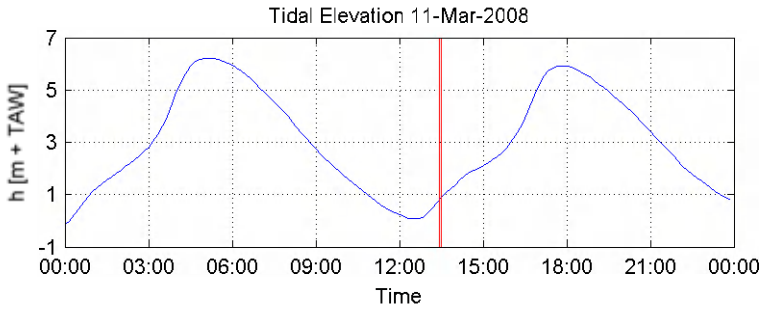
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3043Ktlr_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

13:26 - 13:29

Time after HW [HH:MM]

-4:22

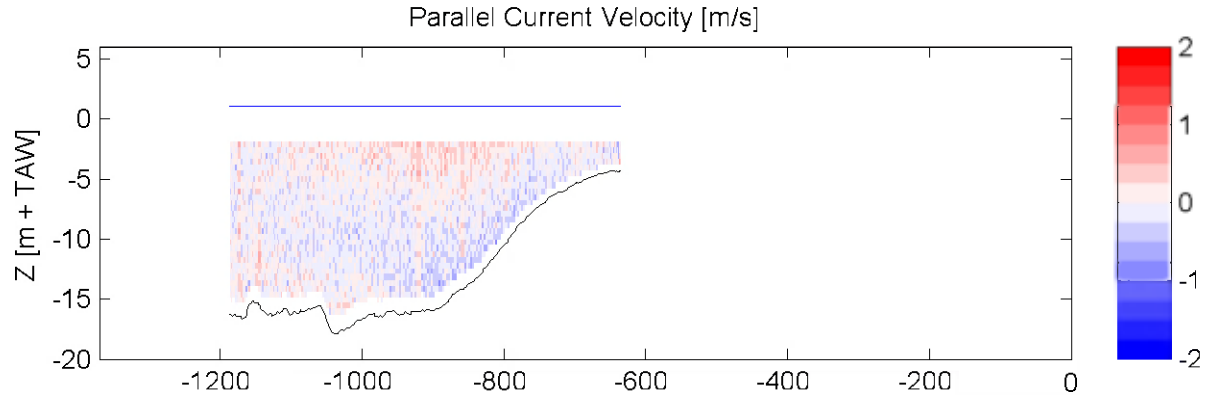
Data Processed by: IMDC

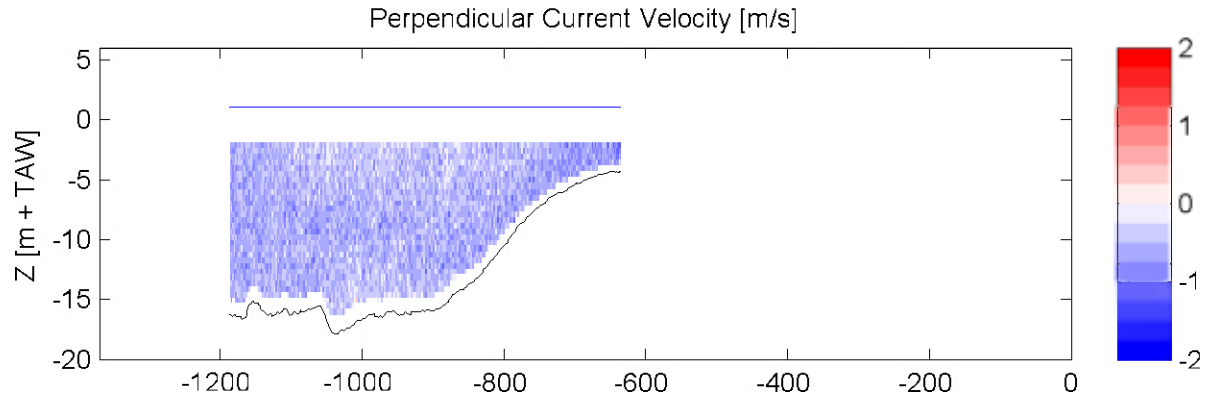
In association with :

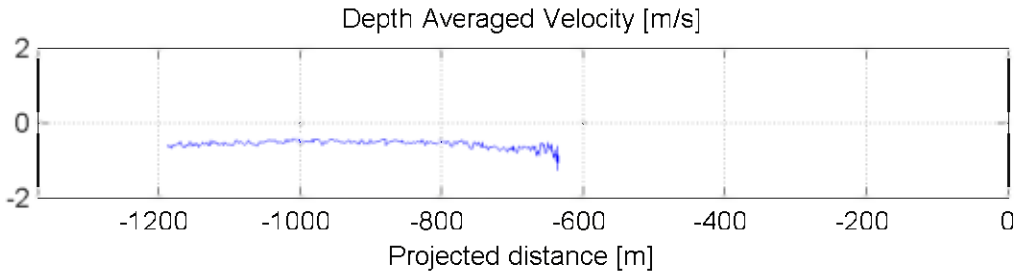
I/RA/11283/07.089/MSA

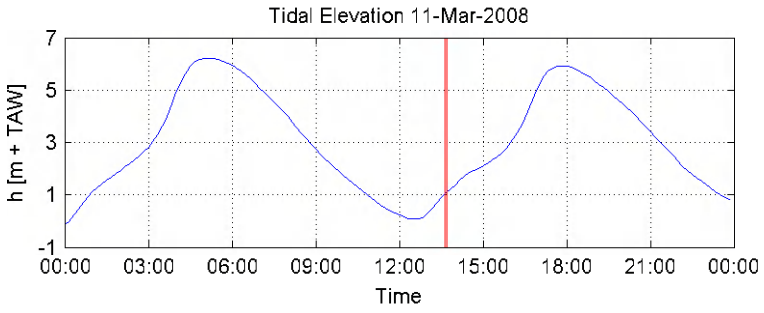
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3045Ktrl_sub.csv	Location: Transect K









HW/LW: 05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

13:38 - 13:42

Time after HW [HH:MM]

-4:09

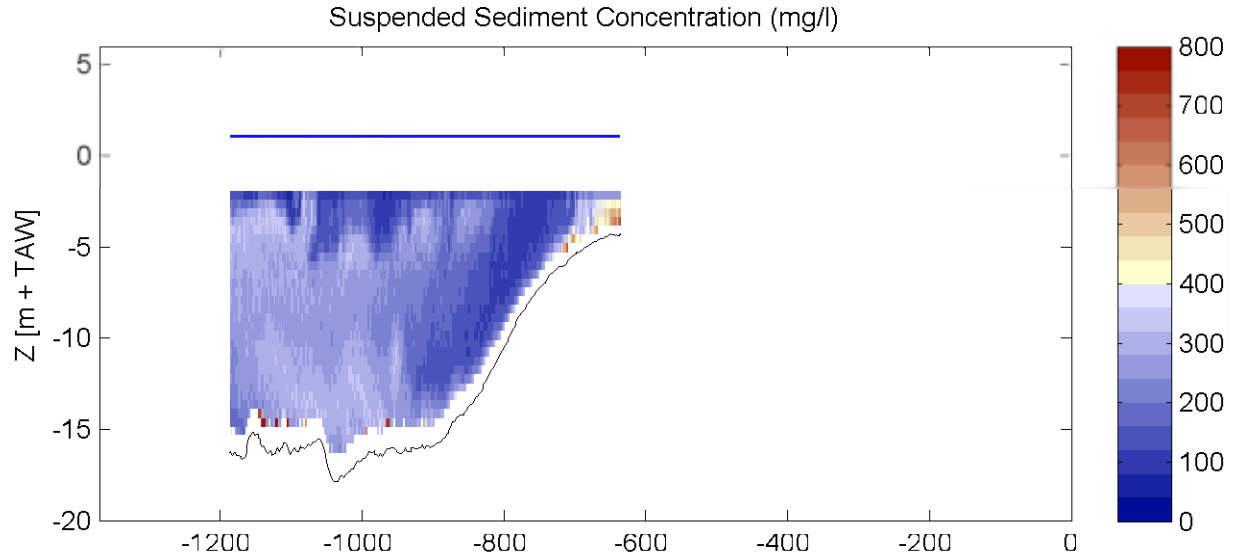
Data Processed by: IMDC

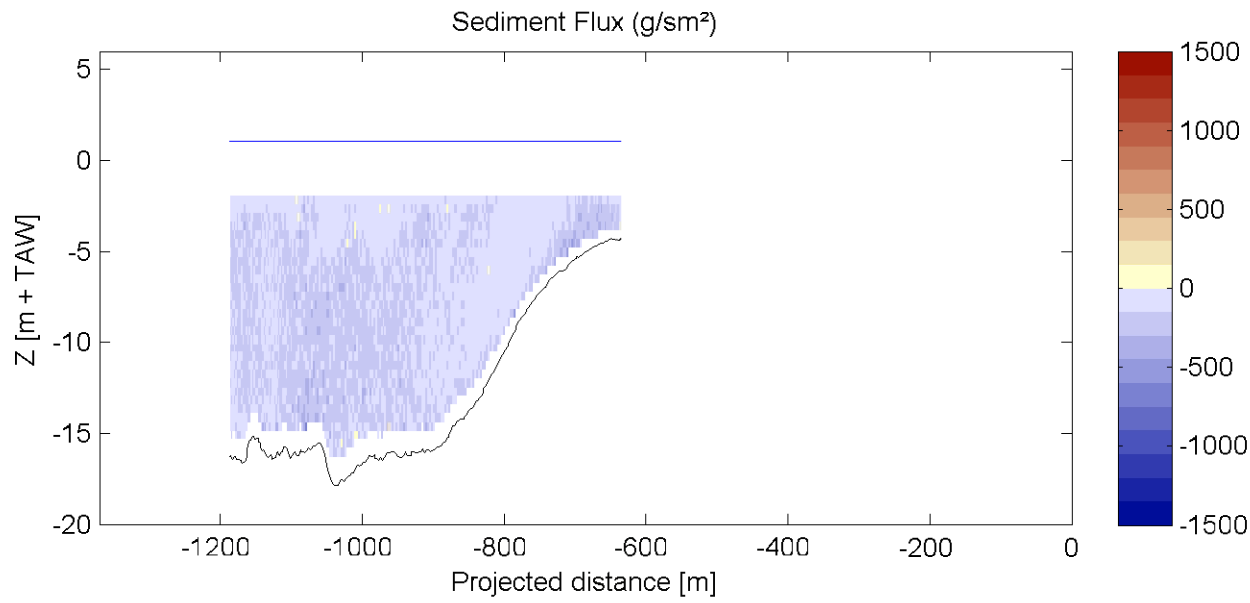
In association with :

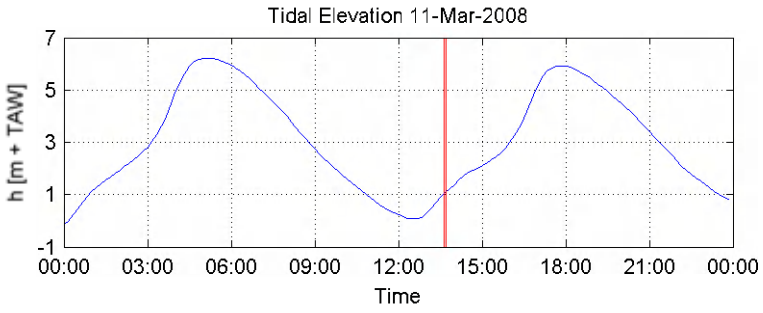
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3045Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

13:38 - 13:42

Time after HW [HH:MM]

-4:09

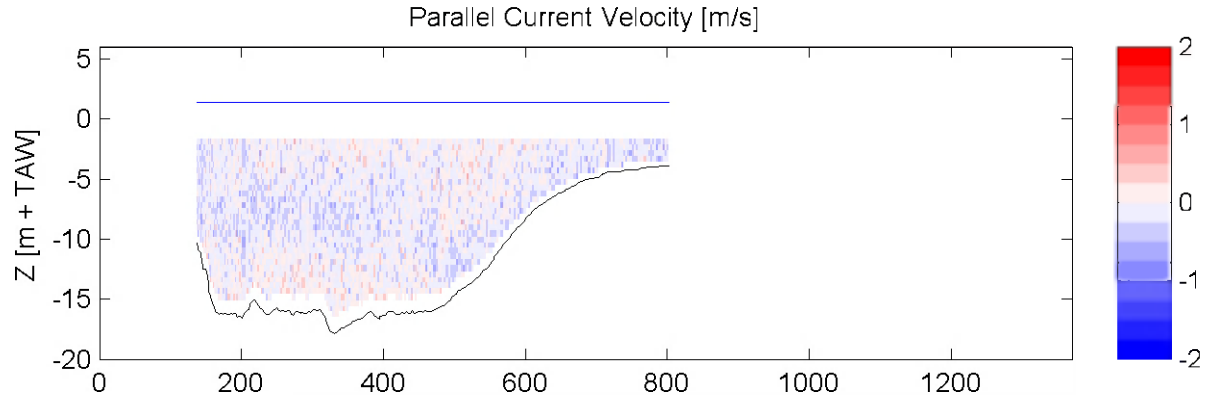
Data Processed by: IMDC

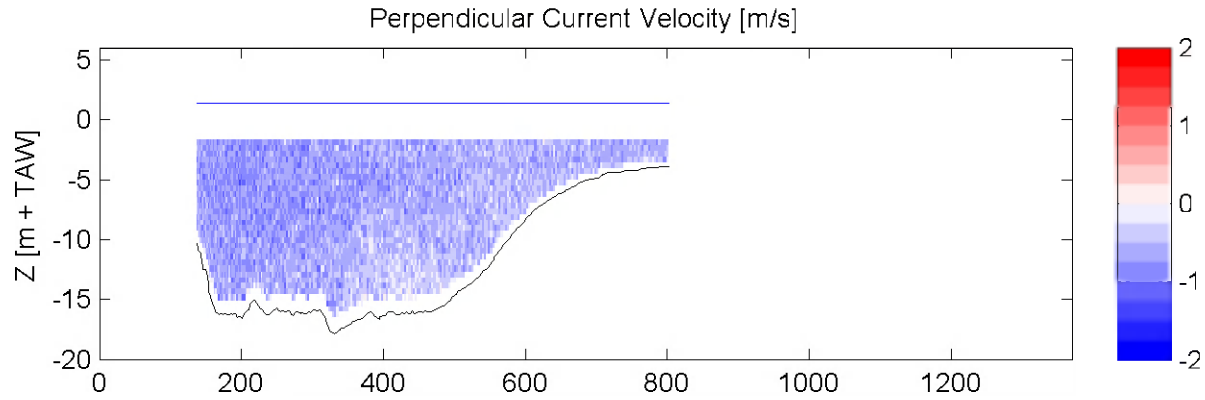
In association with :

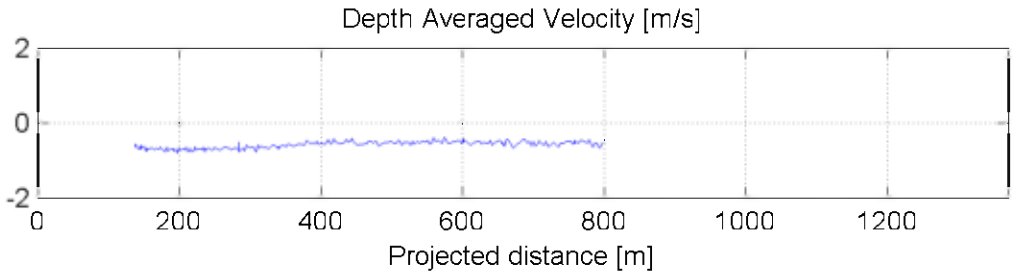
I/RA/11283/07.089/MSA

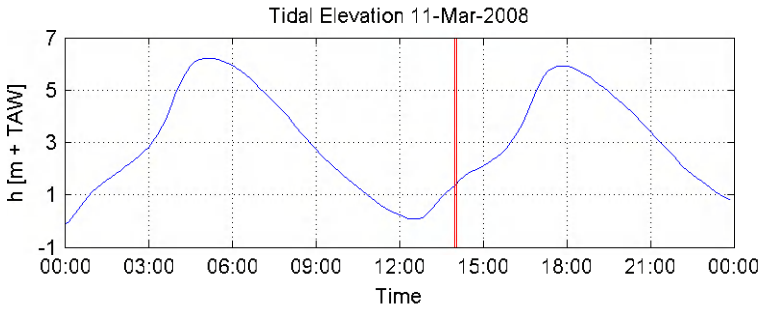
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3047Ktlr_sub.csv	Location: Transect K









HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
13:59 - 14:03

Time after HW [HH:MM]
-3:48

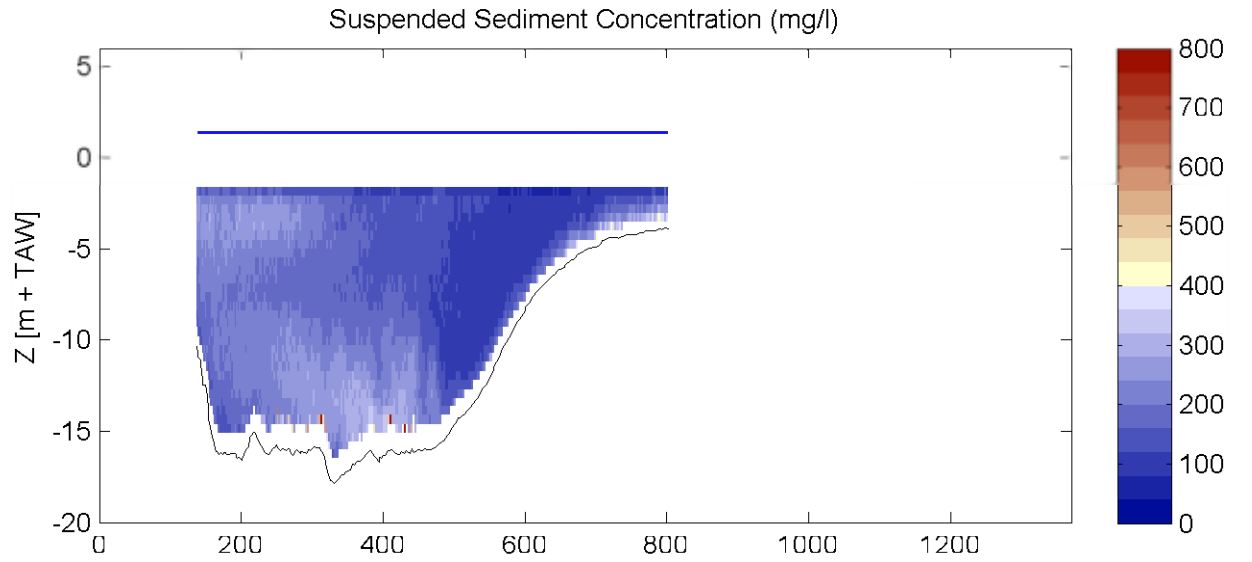
Data Processed by:

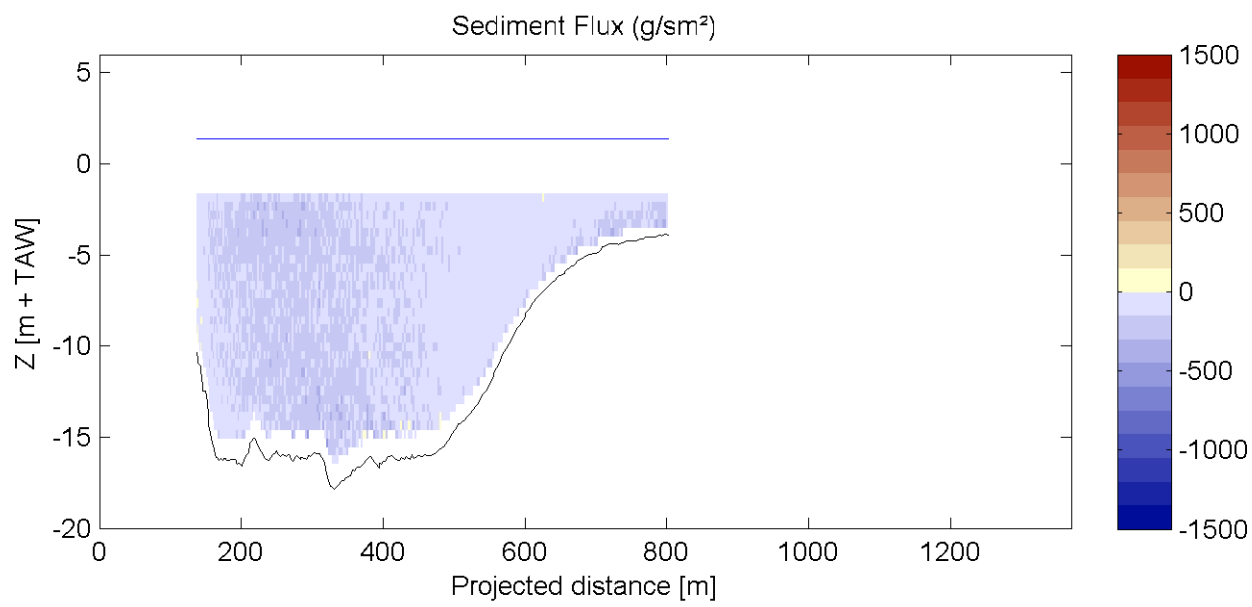
In association with :

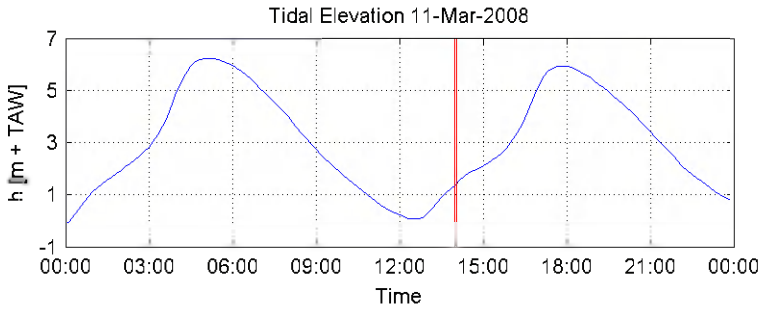
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3047Ktlr_sub.csv	Location: Transect K







HW/LW: 05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

13:59 - 14:03

Time after HW [HH:MM]

-3:48

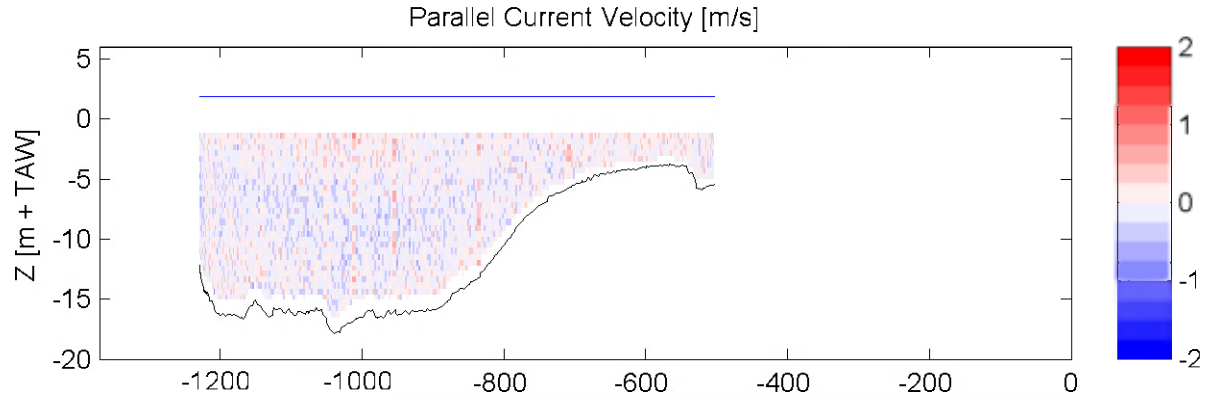
Data Processed by: IMDC

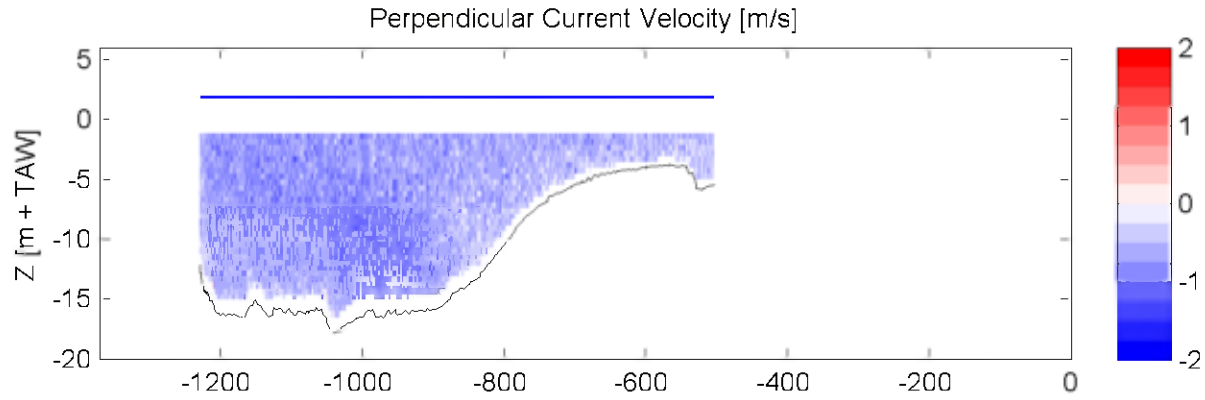
In association with : WL | delft hydraulics, GEMS

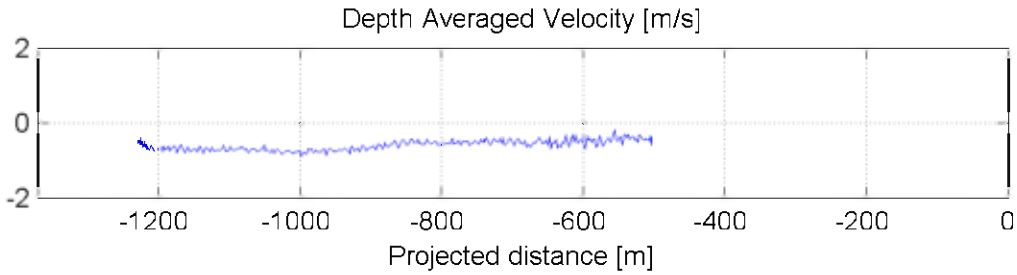
I/RA/11283/07.089/MSA

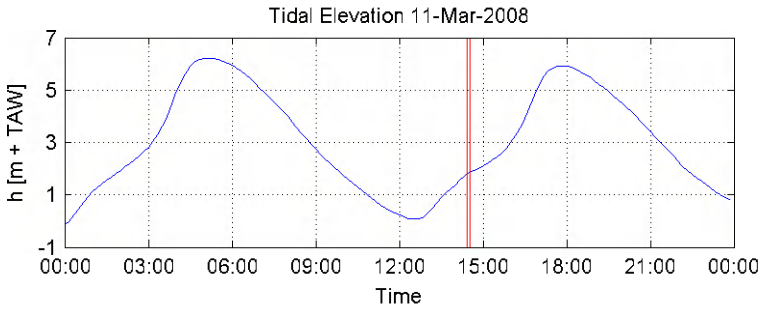
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3049Ktrl_sub.csv	Location: Transect K









HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
14:25 - 14:31

Time after HW [HH:MM]
-3:21

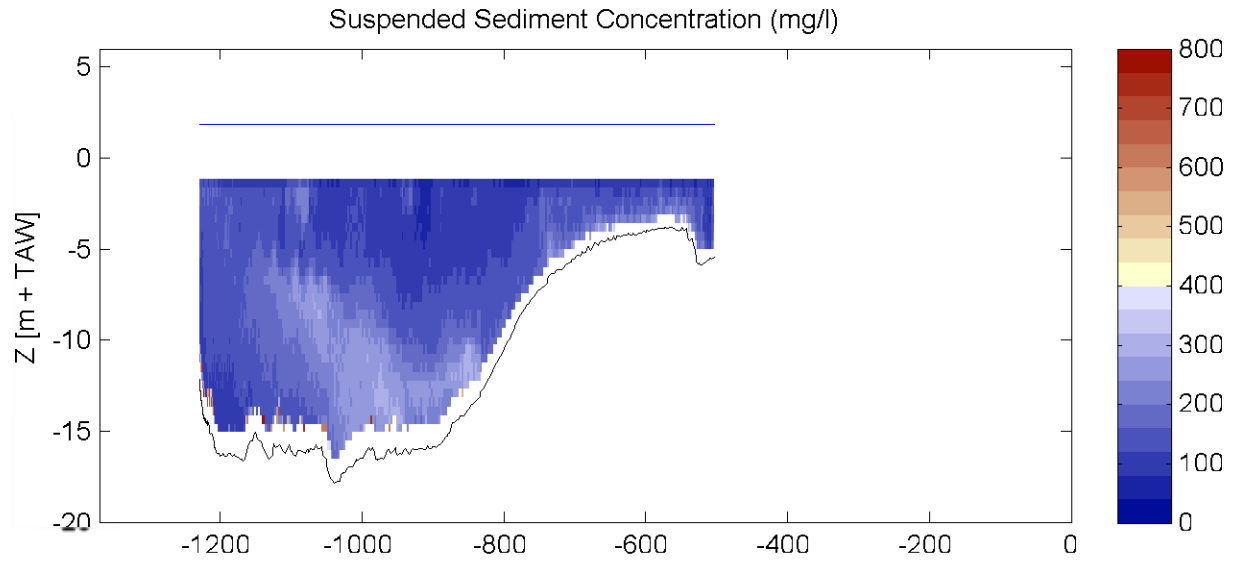
Data Processed by: IMDC

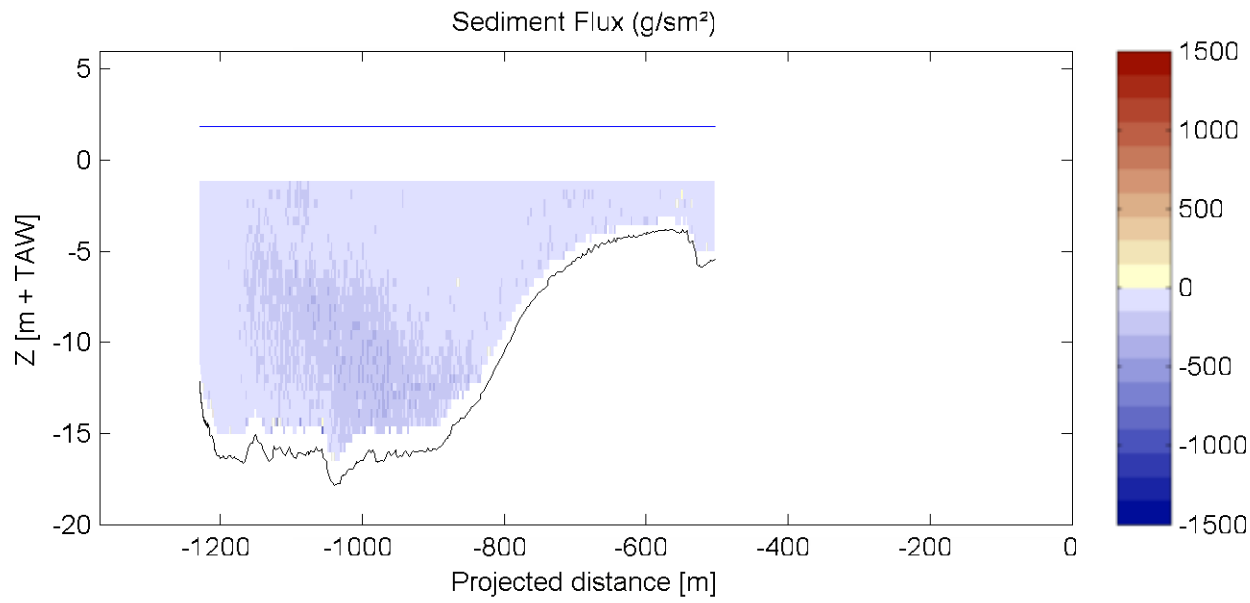
In association with :

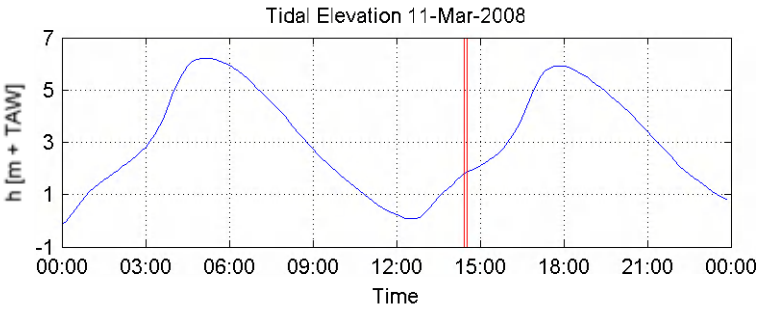
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3049Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

14:25 - 14:31

Time after HW [HH:MM]

-3:21

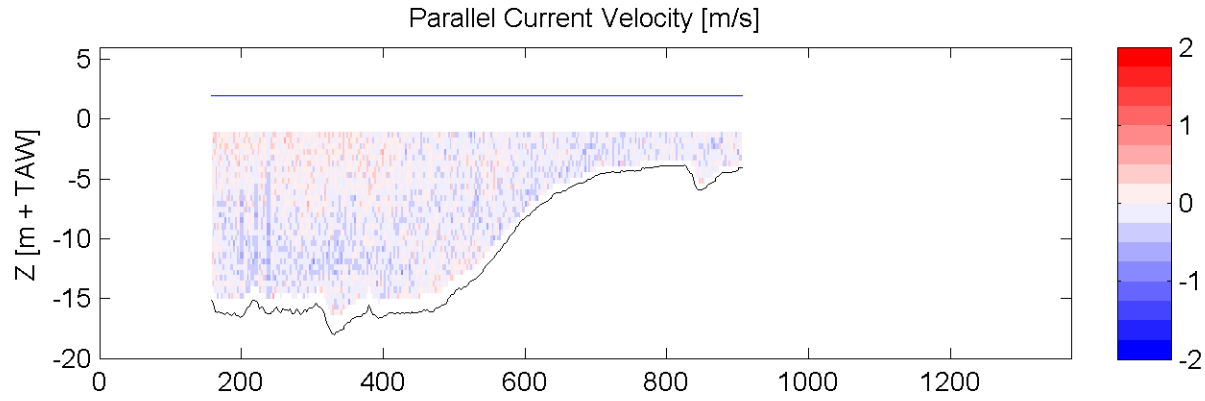
Data Processed by: IMDC

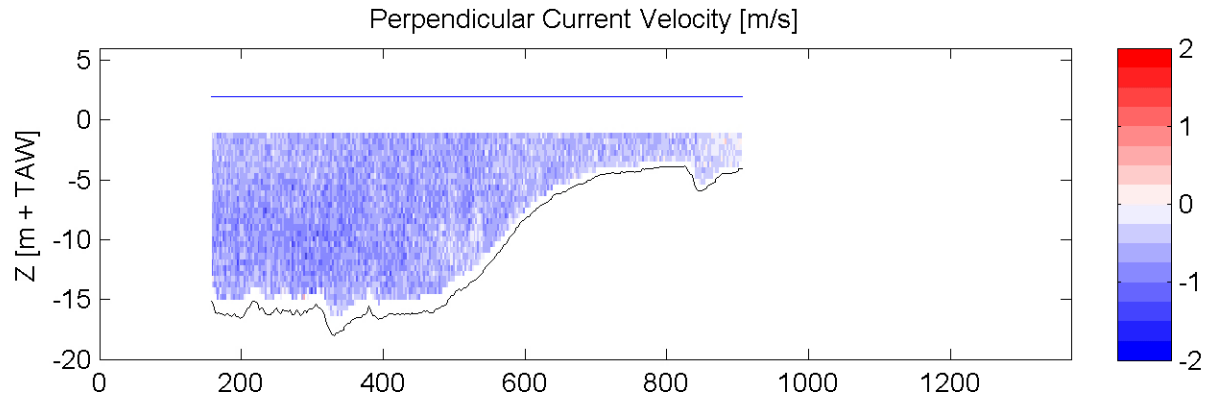
In association with :

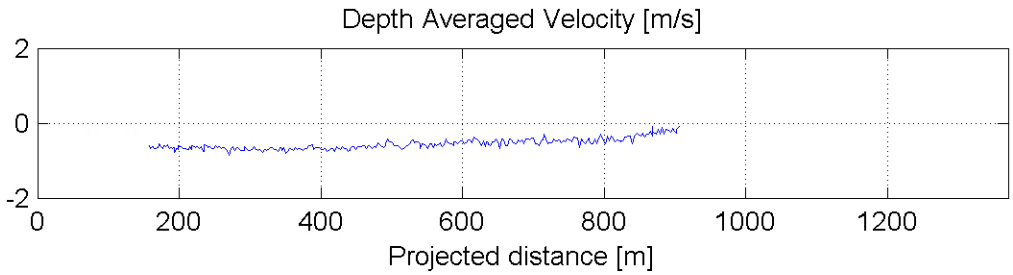
I/RA/11283/07.089/MSA

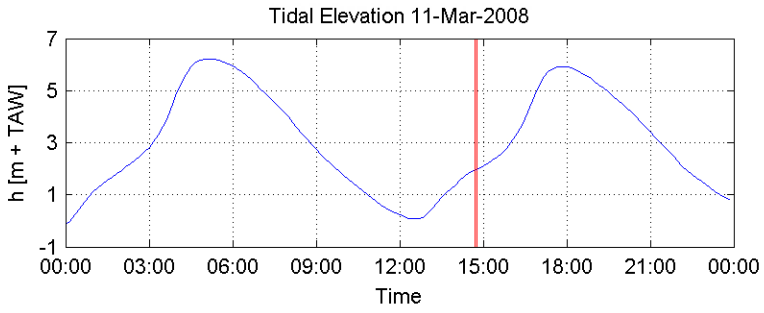
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3051Ktlr_sub.csv	Location: Transect K









HW/LW: 05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

14:42 - 14:47

Time after HW [HH:MM]

-3:04

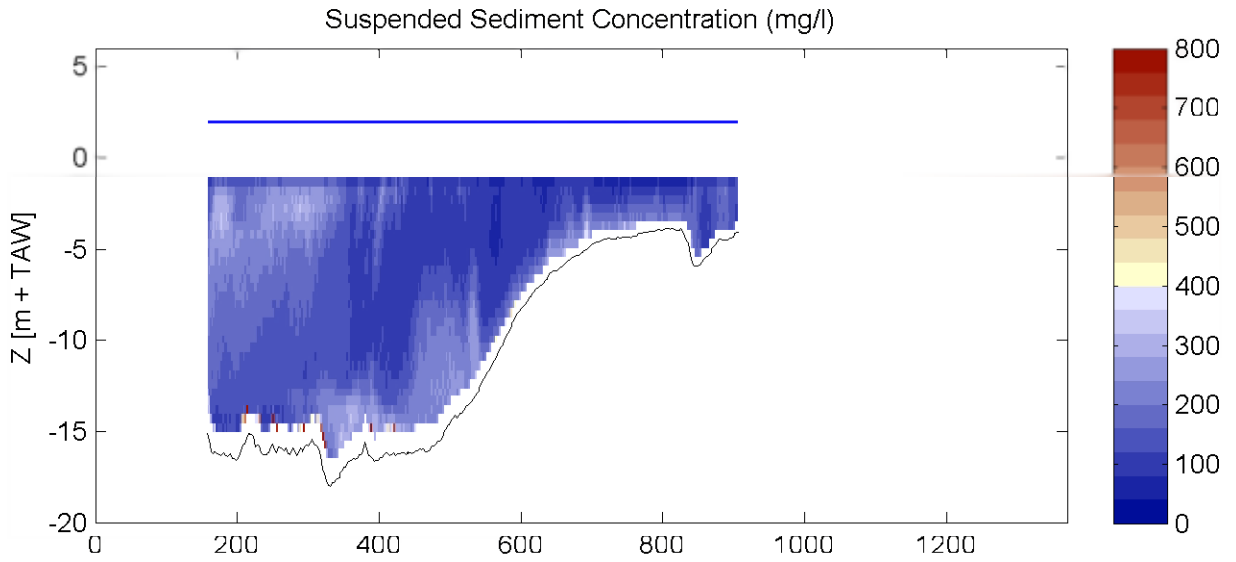
Data Processed by: IMDC

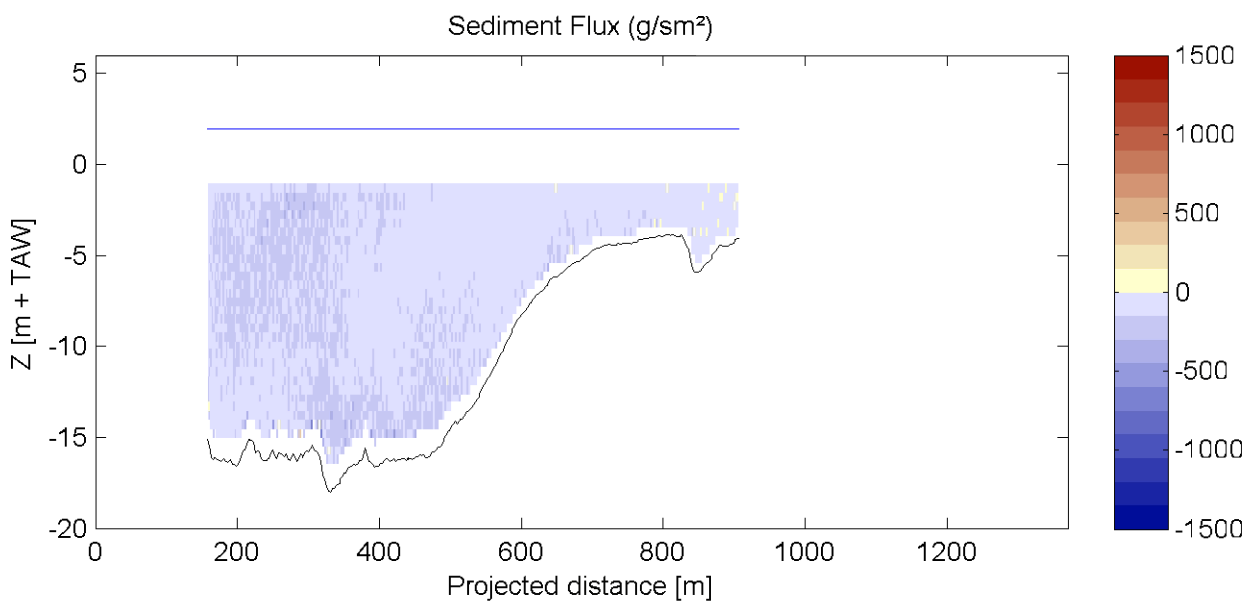
In association with : WL | delft hydraulics, GEMS International

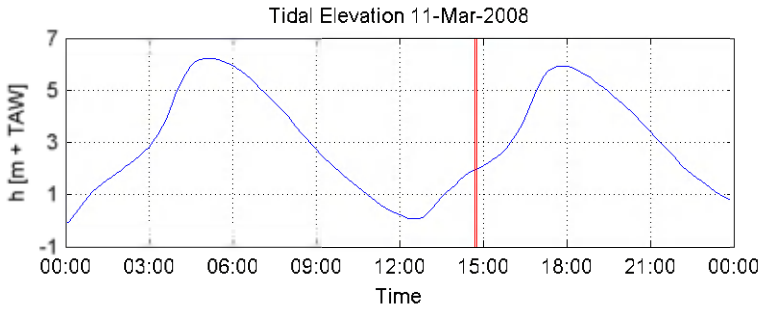
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3051Ktlr_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
14:42 - 14:47

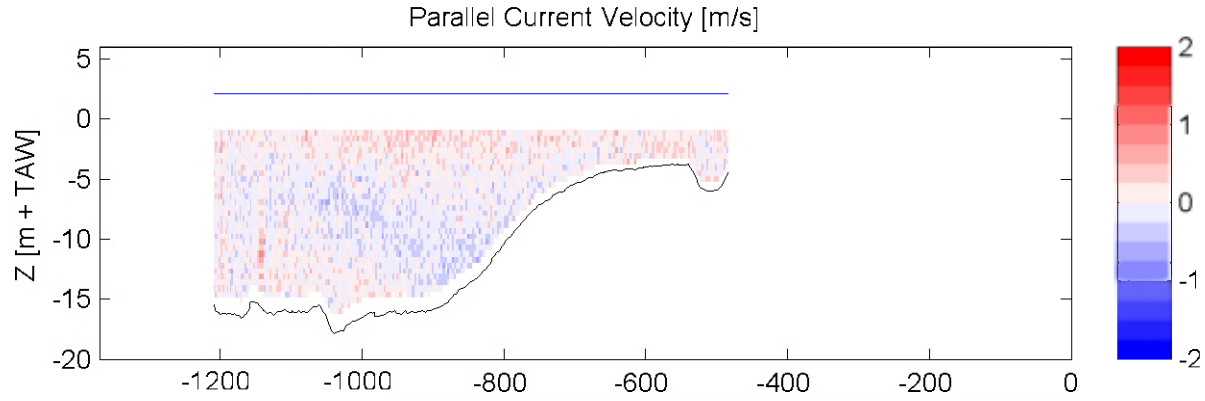
Time after HW [HH:MM]
-3:04

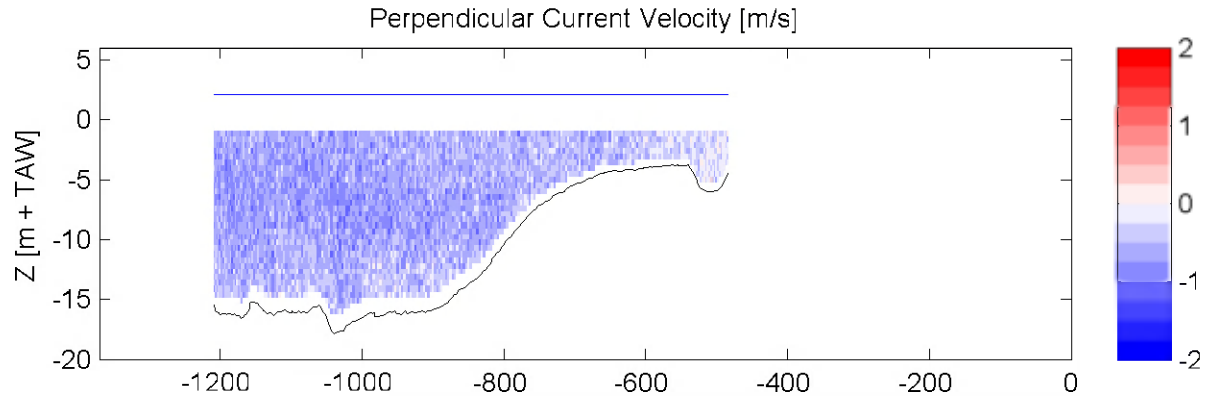
Data Processed by: IMDC
In association with :

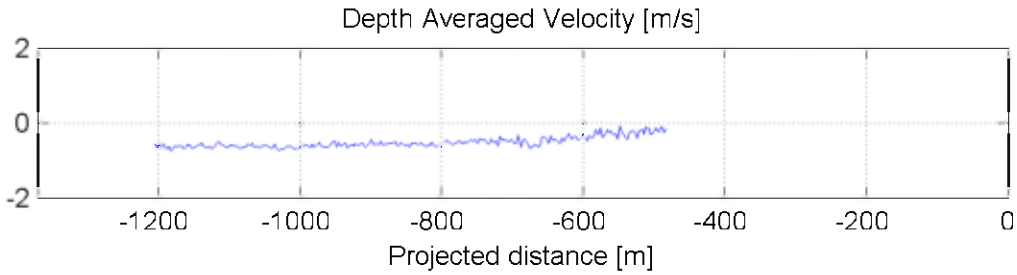
I/RA/11283/07.089/MSA

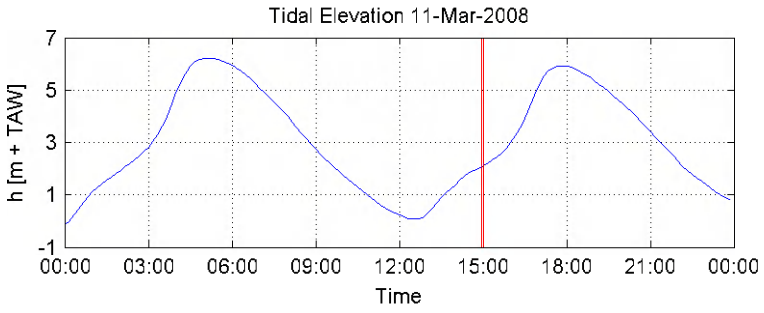
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3053Ktrl_sub.csv	Location: Transect K









HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
14:57 - 15:01

Time after HW [HH:MM]
-2:50

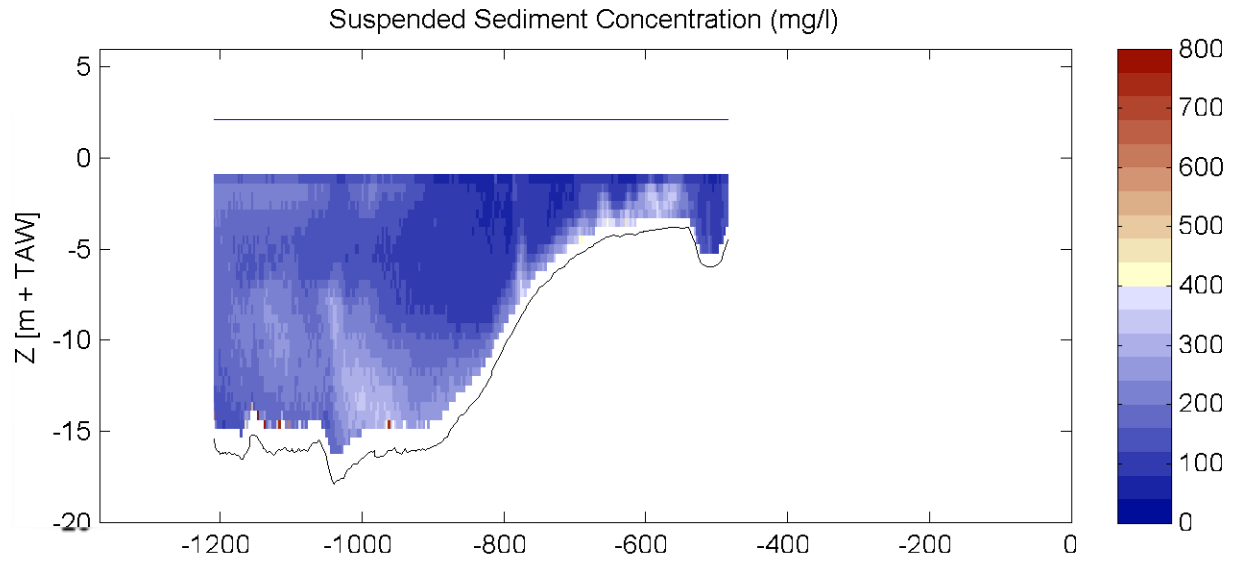
Data Processed by: IMDC

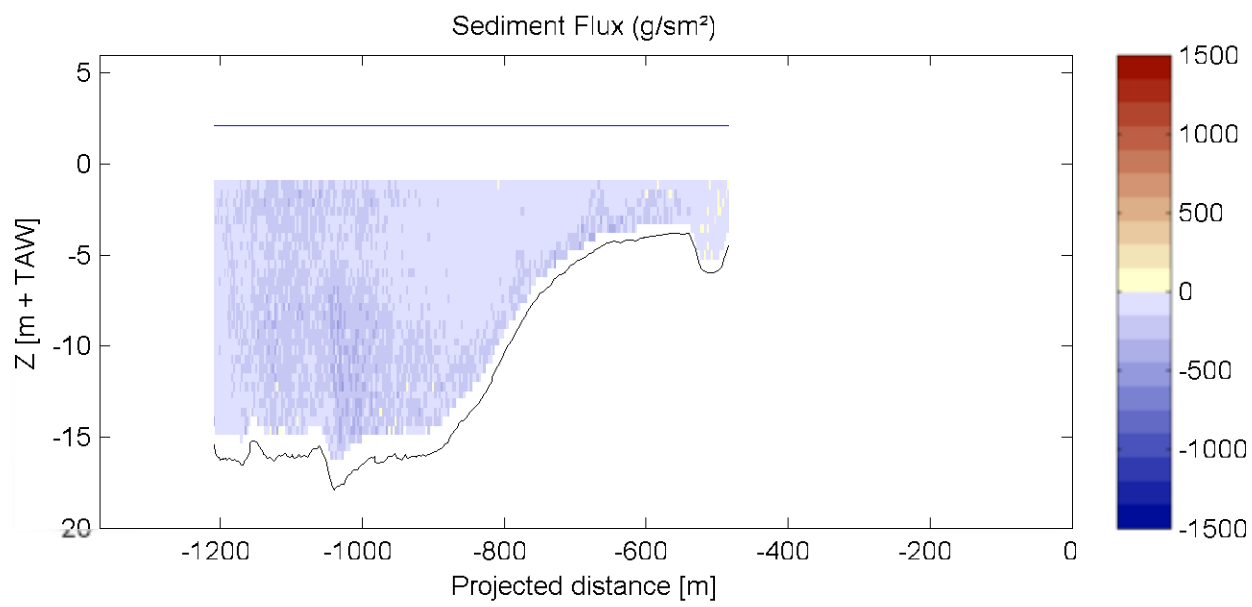
In association with :

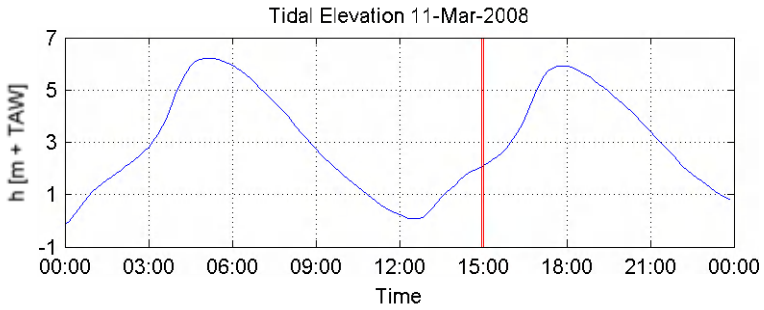
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3053Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
14:57 - 15:01

Time after HW [HH:MM]
-2:50

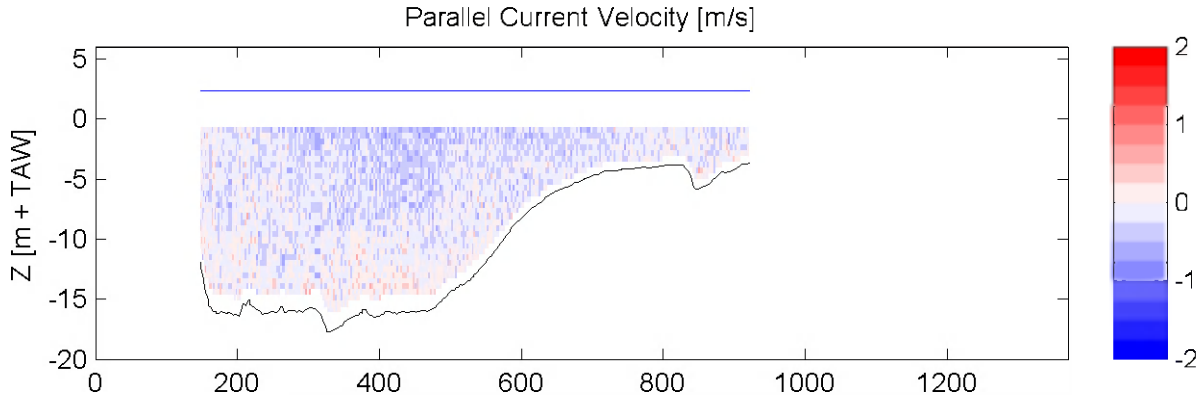
Data Processed by: IMDC

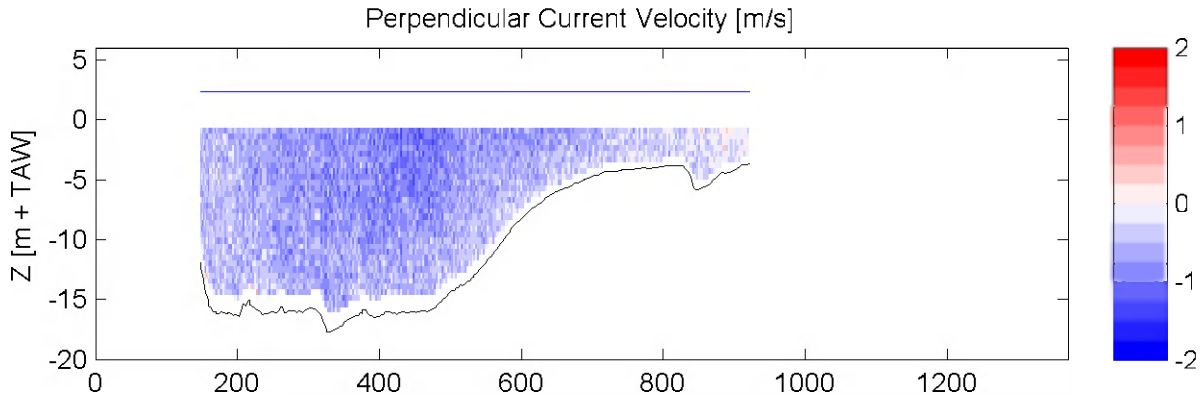
In association with :

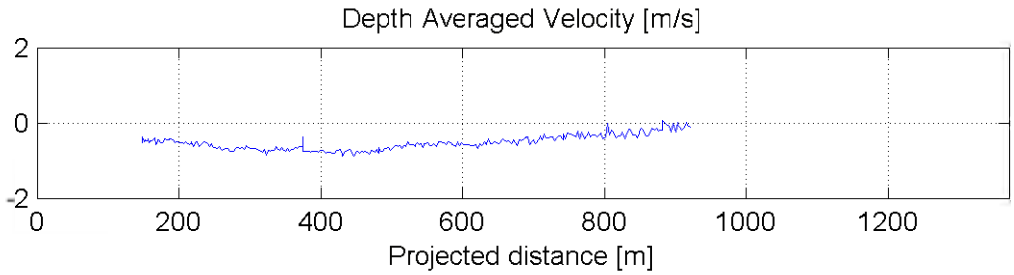
I/RA/11283/07.089/MSA

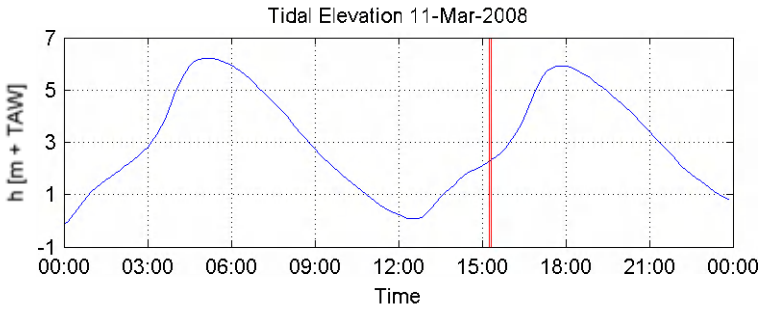
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3055Ktlr_sub.csv	Location: Transect K









HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

15:15 - 15:19

Time after HW [HH:MM]

-2:32

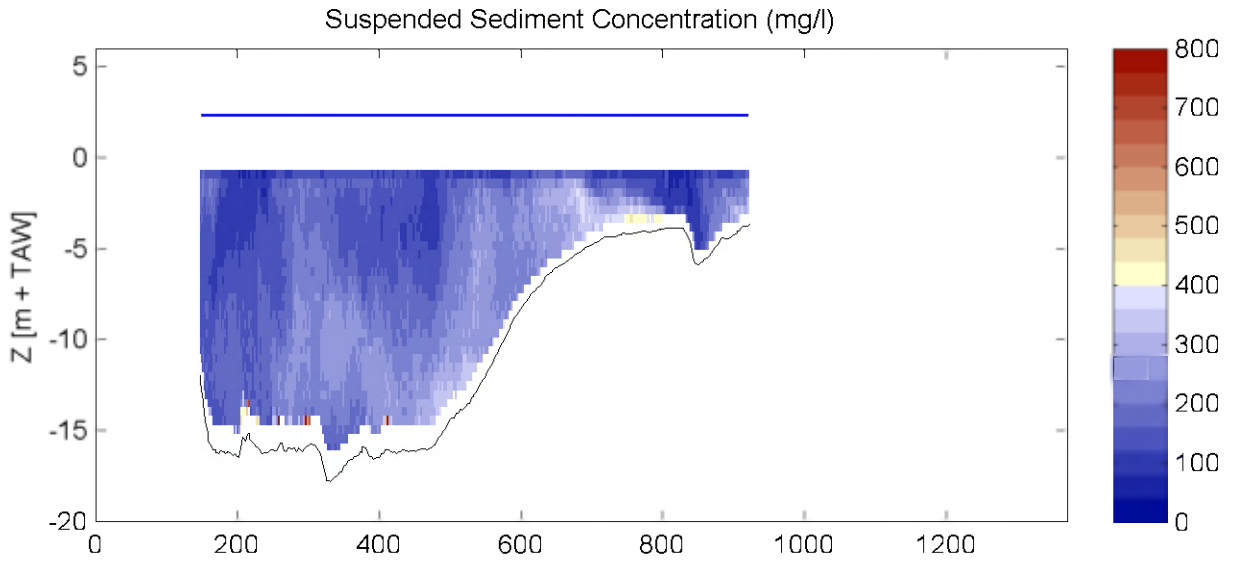
Data Processed by: IMDC

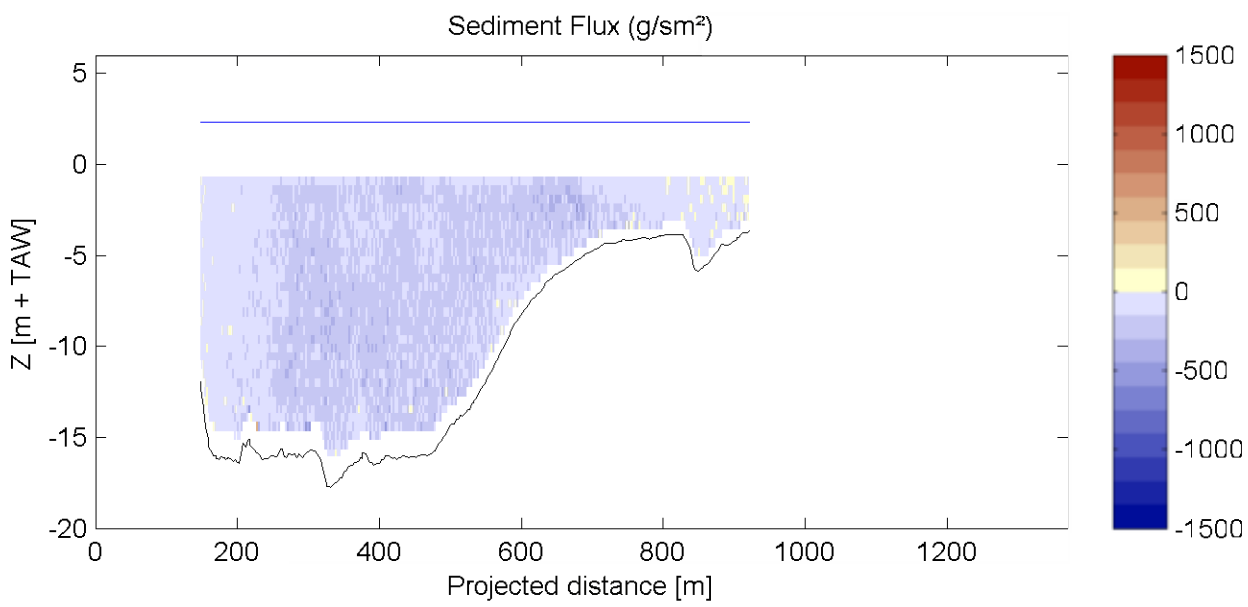
In association with :

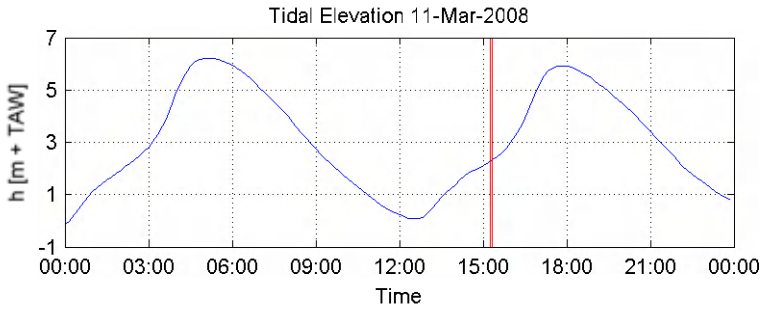
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3055Ktlr_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

15:15 - 15:19

Time after HW [HH:MM]

-2:32

Data Processed by: IMDC

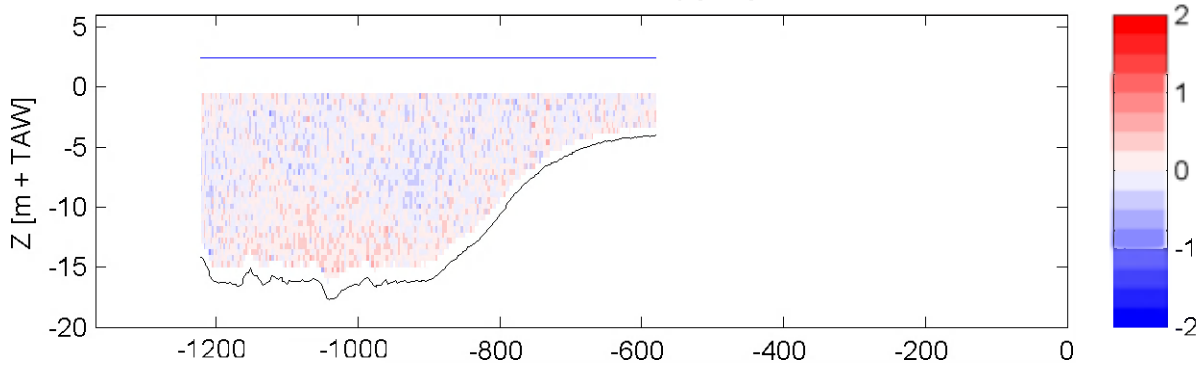
In association with : WL | Delft Hydraulics, GEMS

I/RA/11283/07.089/MSA

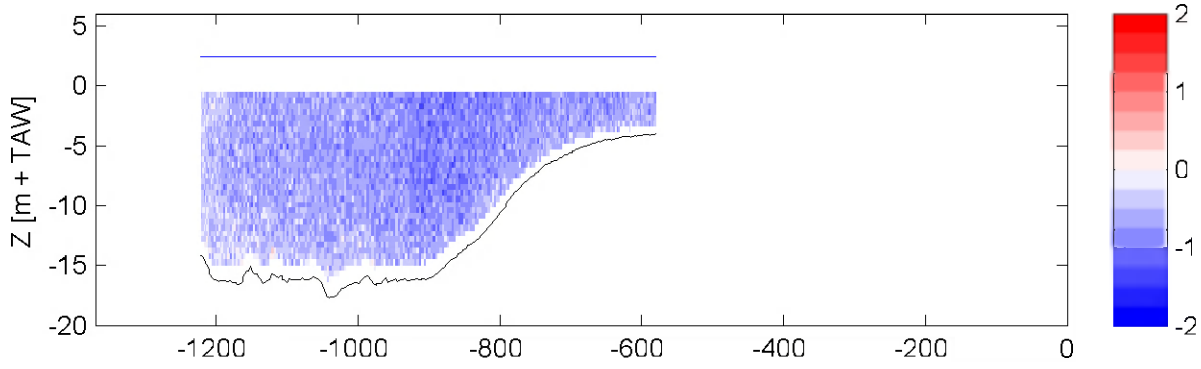
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3057Ktrl_sub.csv	Location: Transect K

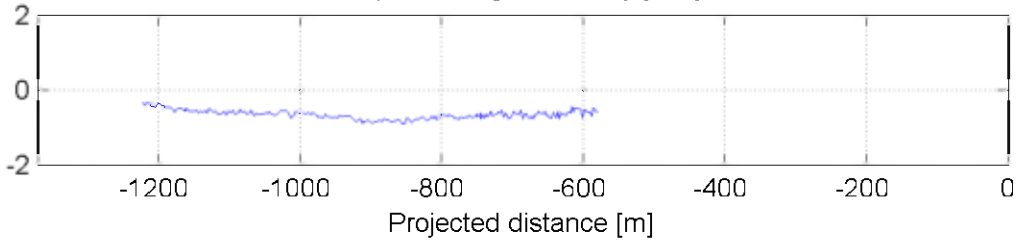
Parallel Current Velocity [m/s]



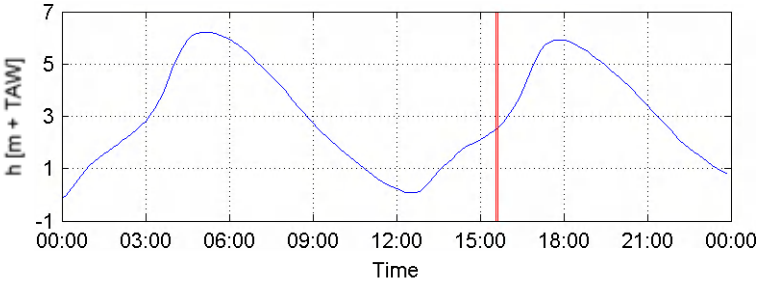
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
15:34 - 15:38

Time after HW [HH:MM]
-2:13

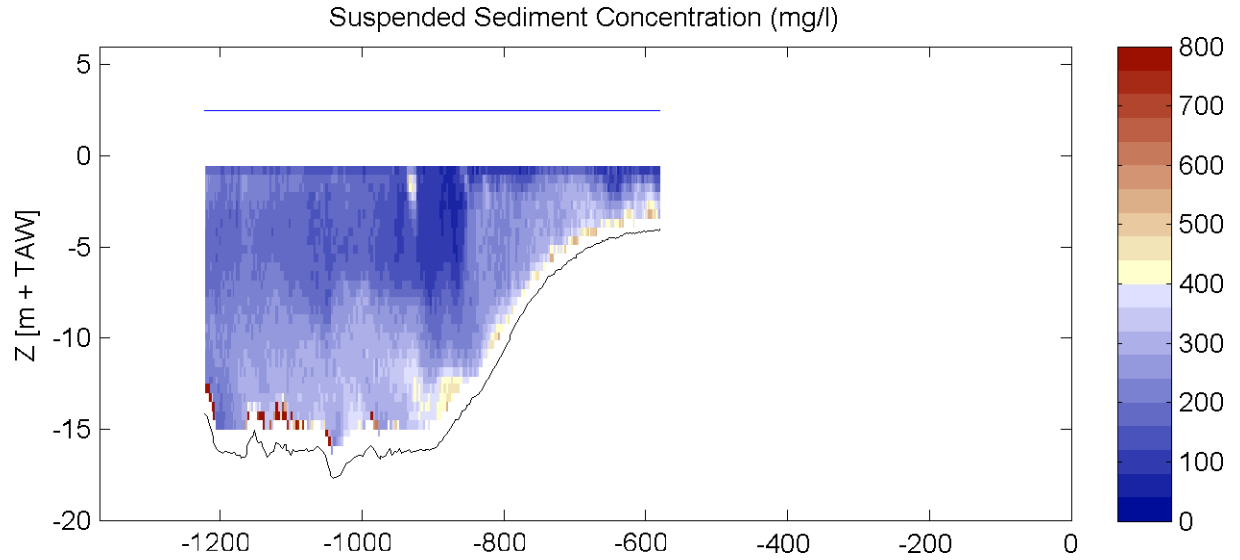
Data Processed by: IMDC

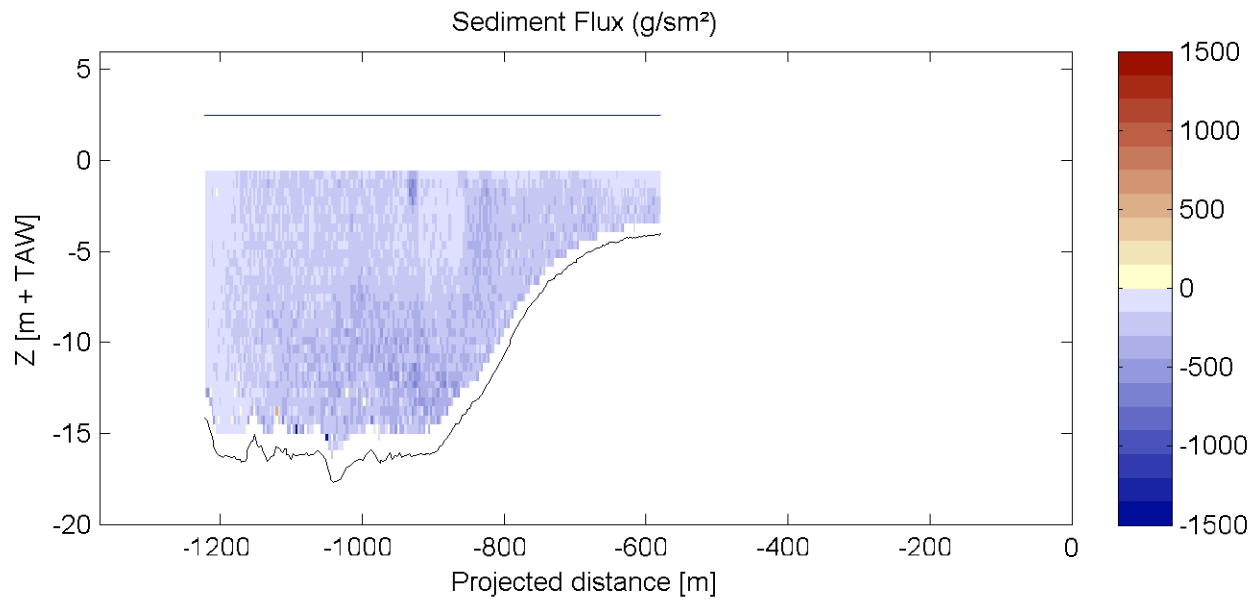
In association with :

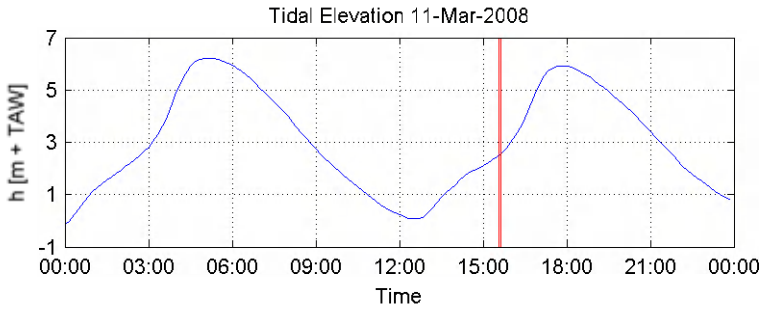
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3057Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

15:34 - 15:38

Time after HW [HH:MM]

-2:13

Data Processed by: IMDC

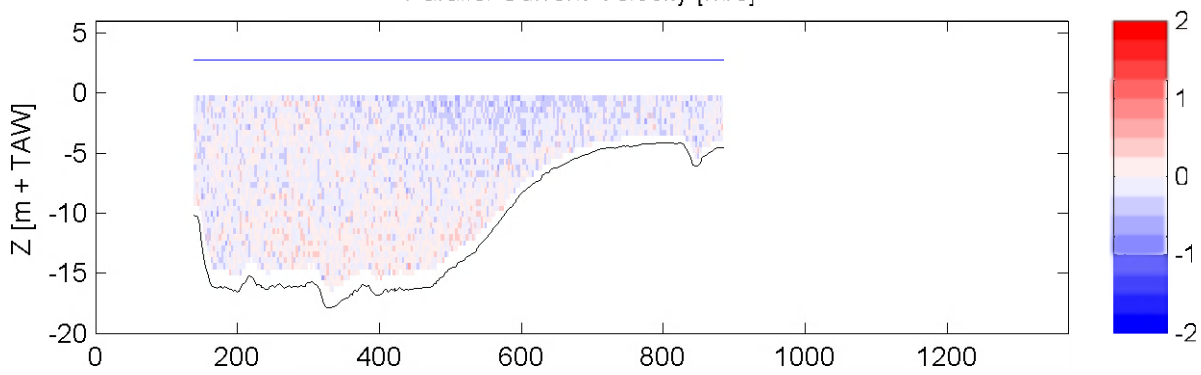
In association with :

I/RA/11283/07.089/MSA

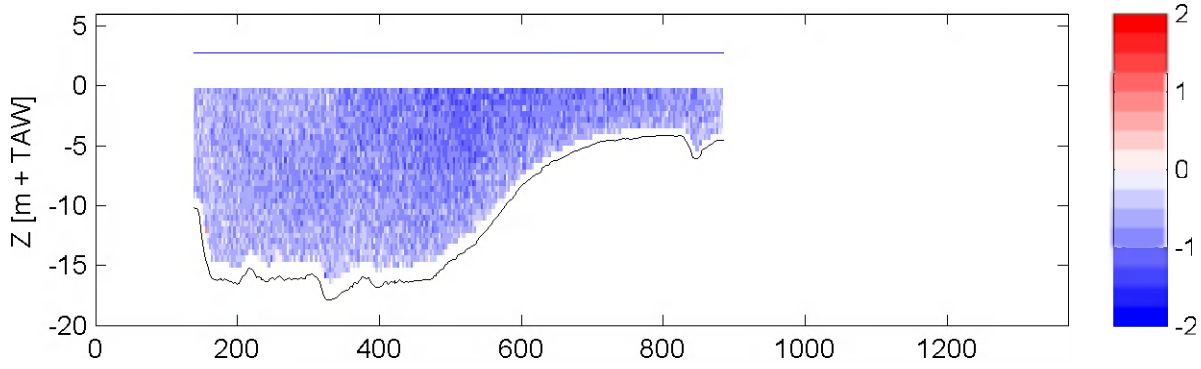
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3059Ktlr_sub.csv	Location: Transect K

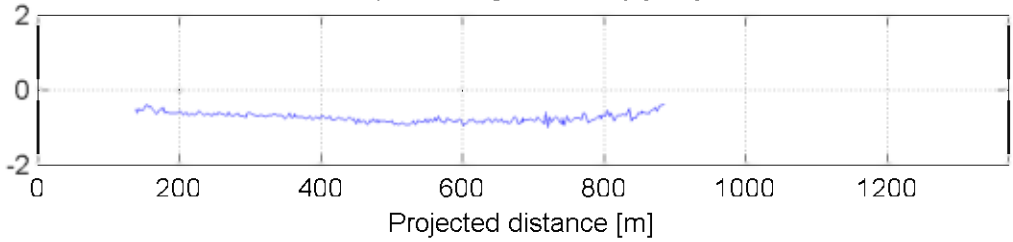
Parallel Current Velocity [m/s]



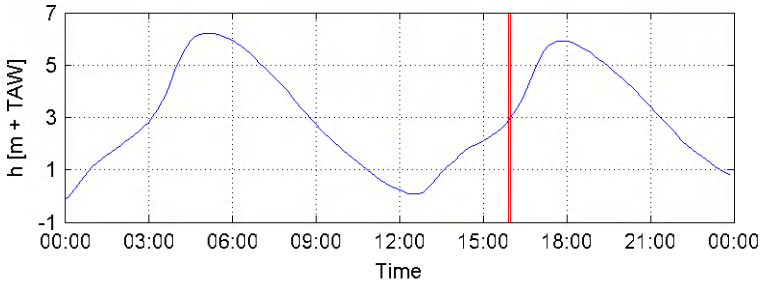
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
15:54 - 15:58

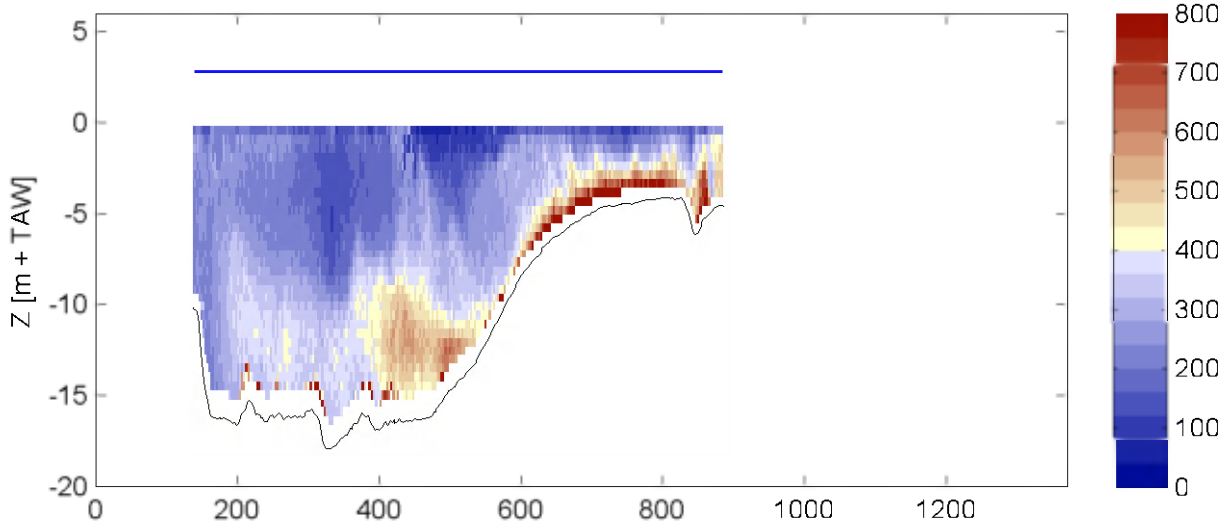
Time after HW [HH:MM]
-1:53

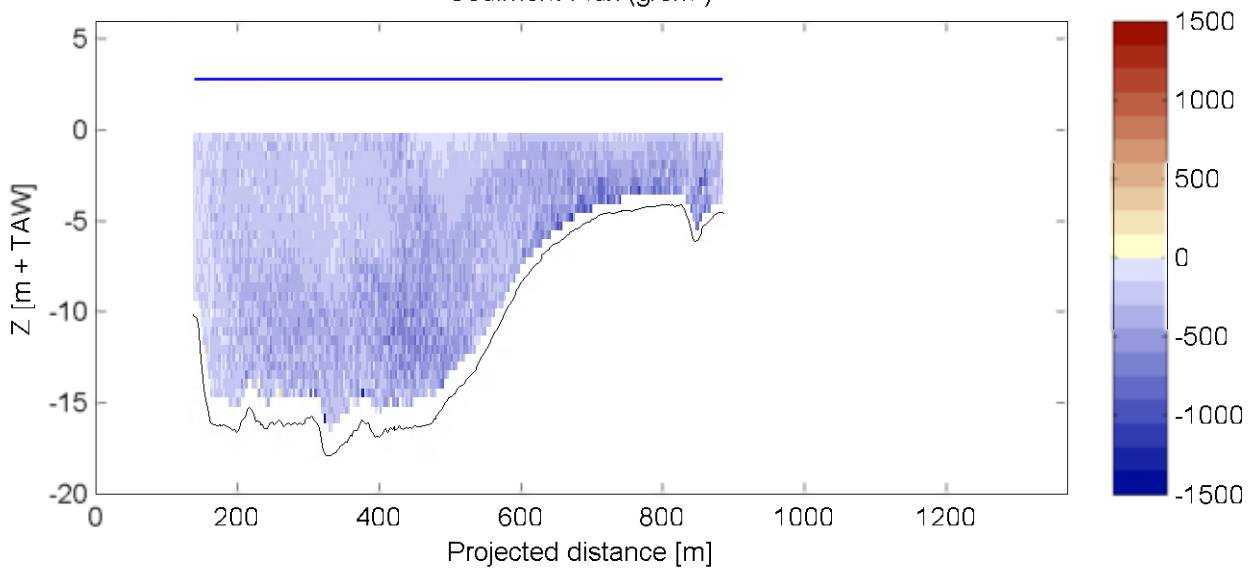
Data Processed by: IMDC
In association with :

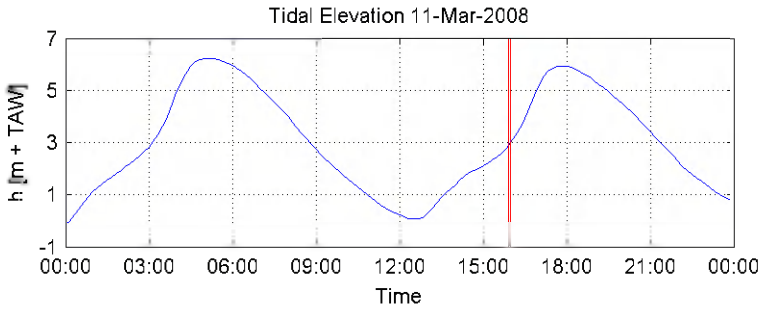
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3059Ktlr_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

15:54 - 15:58

Time after HW [HH:MM]

-1:53

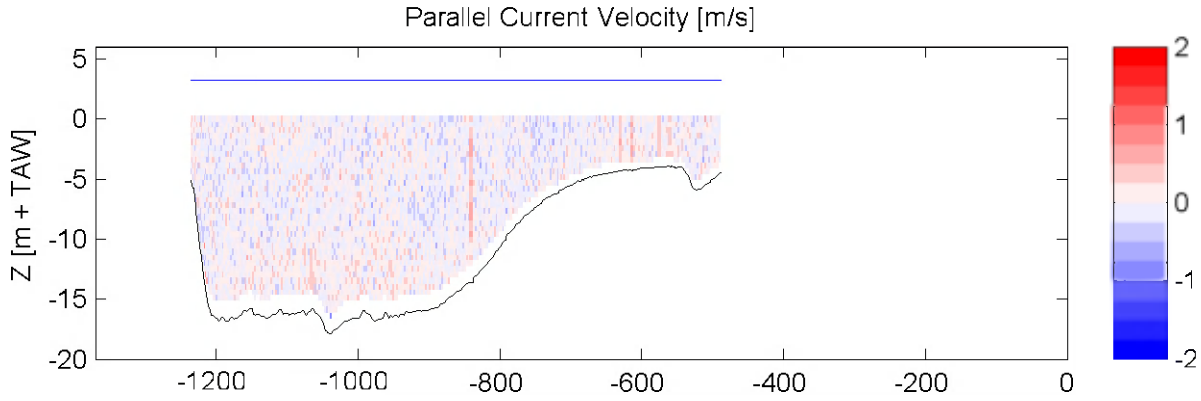
Data Processed by: IMDC

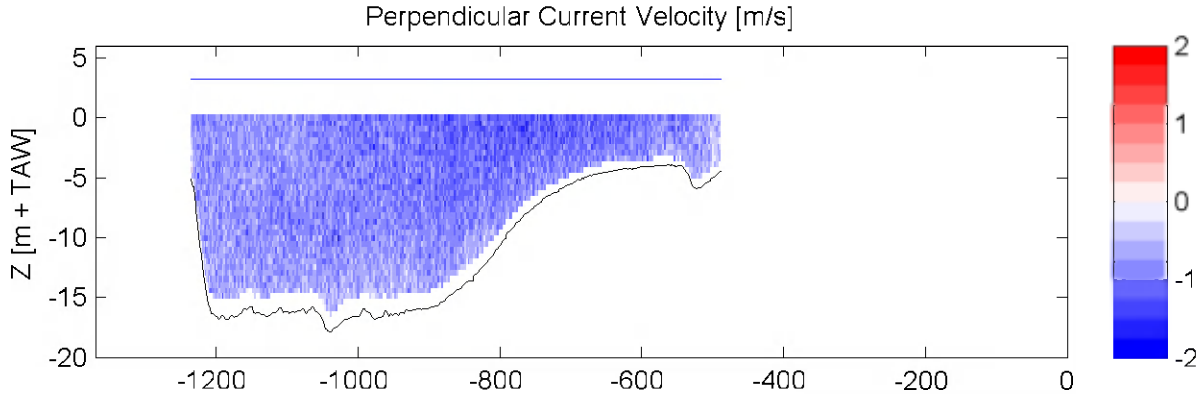
In association with :

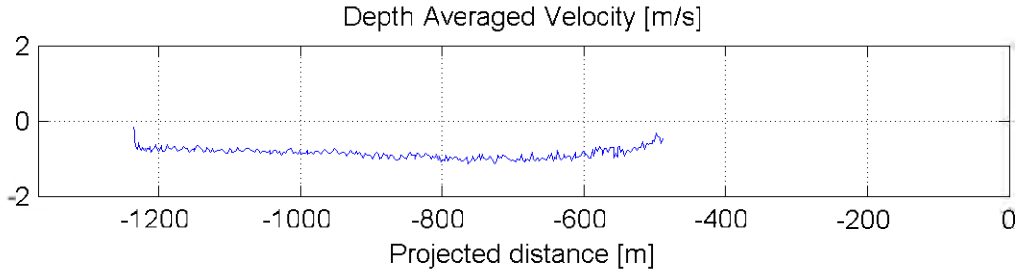
I/RA/11283/07.089/MSA

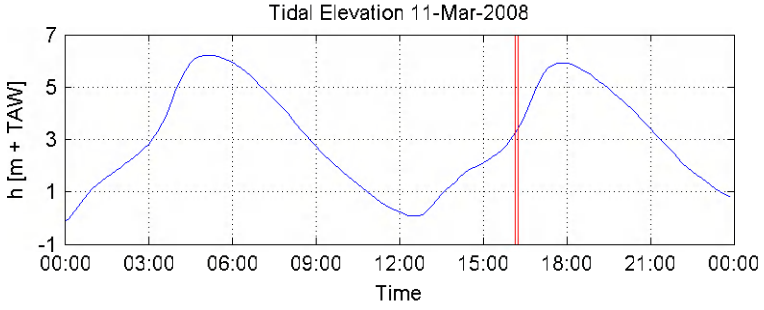
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3061Ktrl_sub.csv	Location: Transect K









HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

16:09 - 16:15

Time after HW [HH:MM]

-1:37

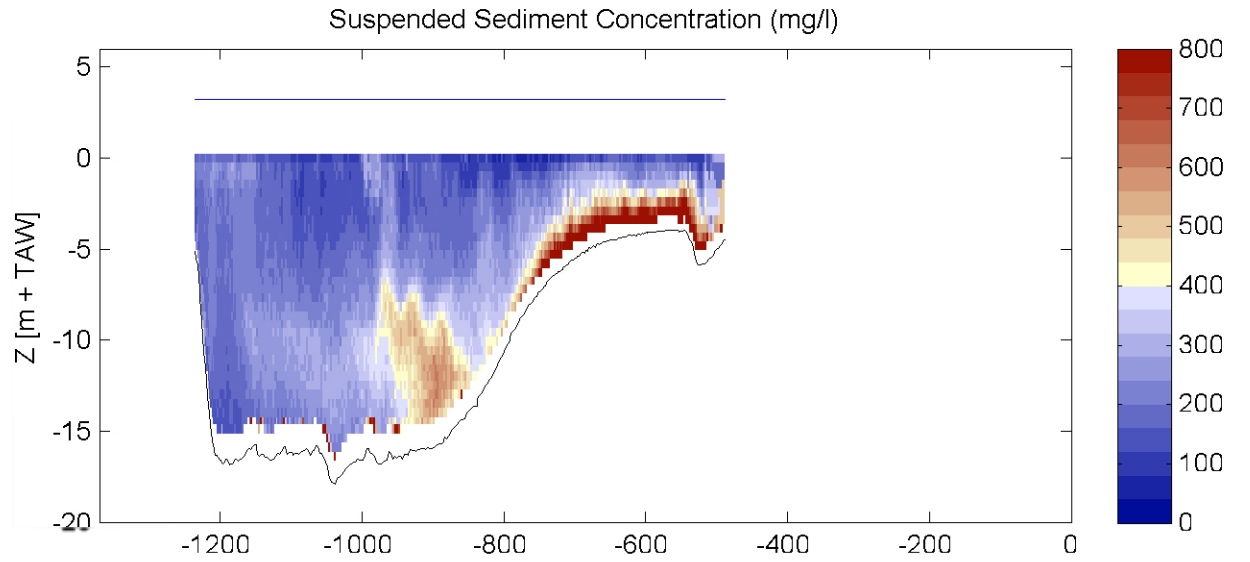
Data Processed by: IMDC

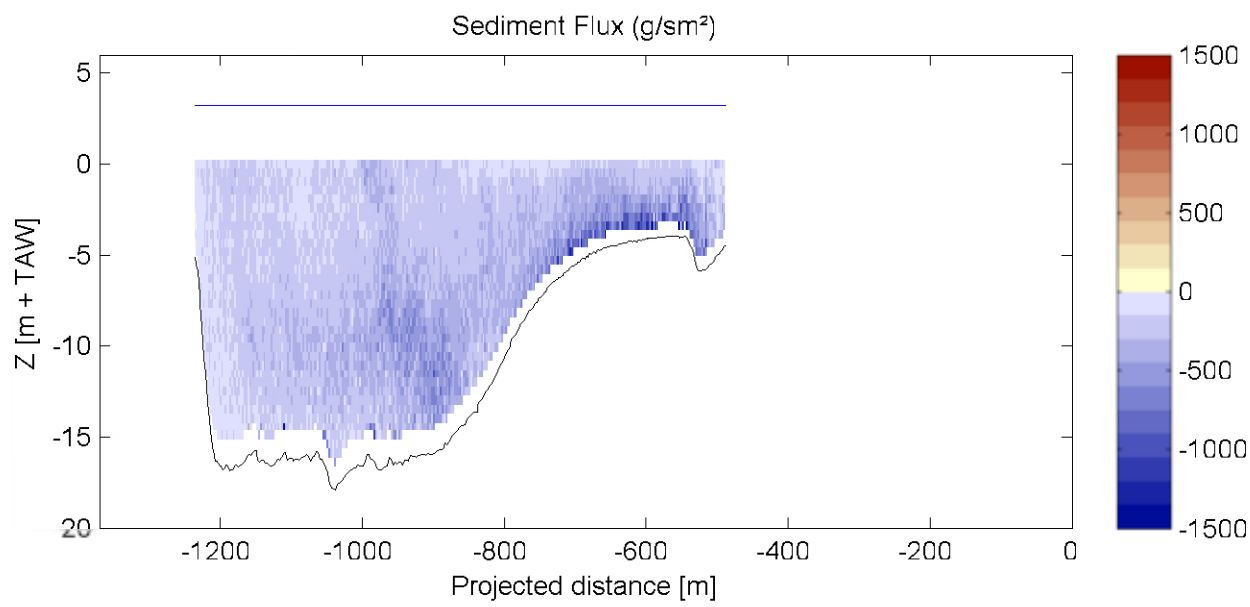
In association with :

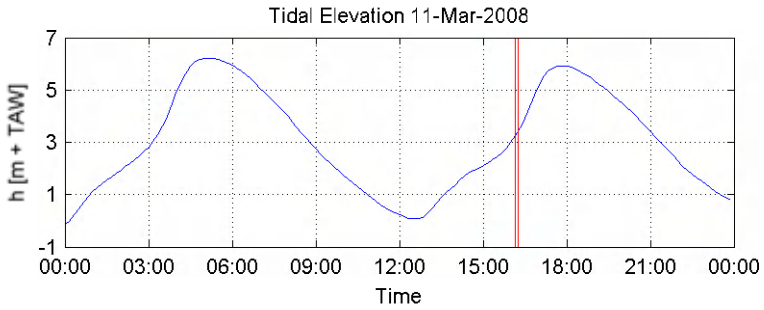
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3061Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

16:09 - 16:15

Time after HW [HH:MM]

-1:37

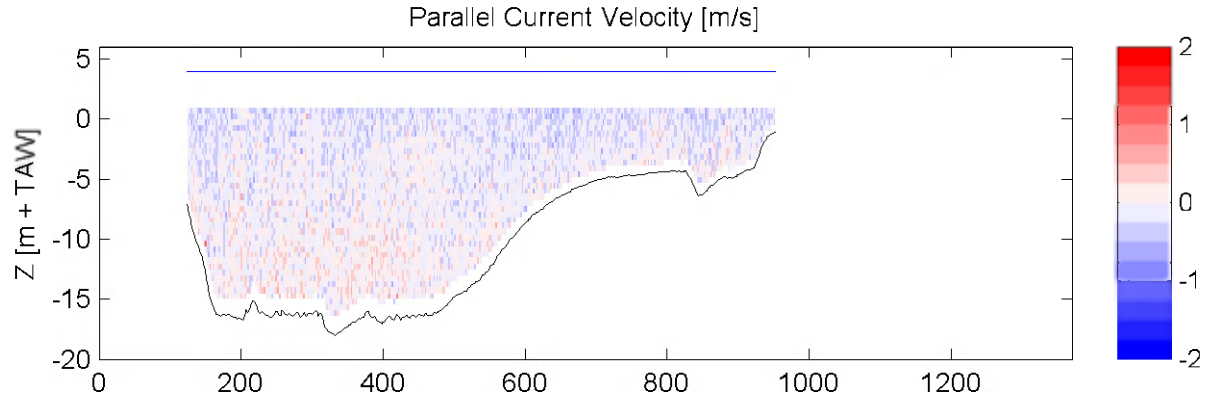
Data Processed by: IMDC

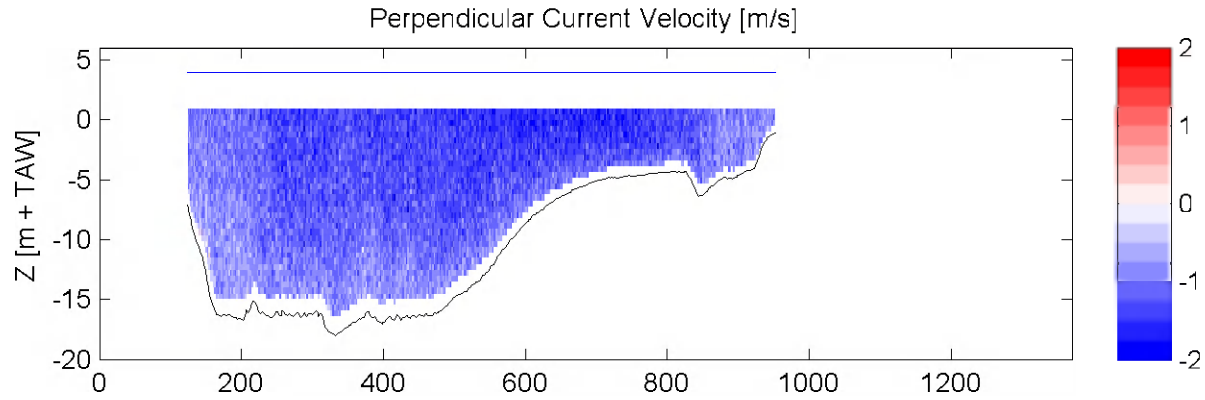
In association with :

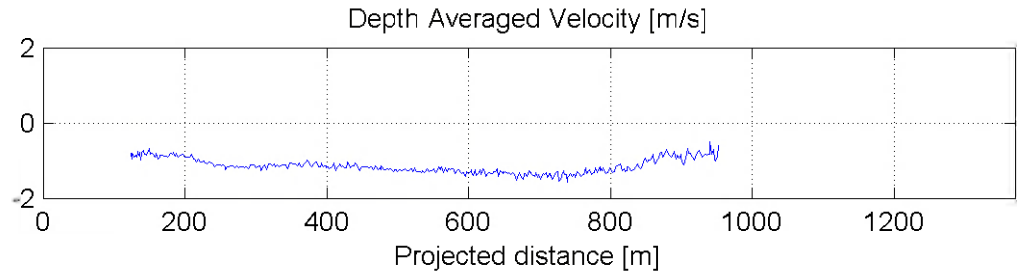
I/RA/11283/07.089/MSA

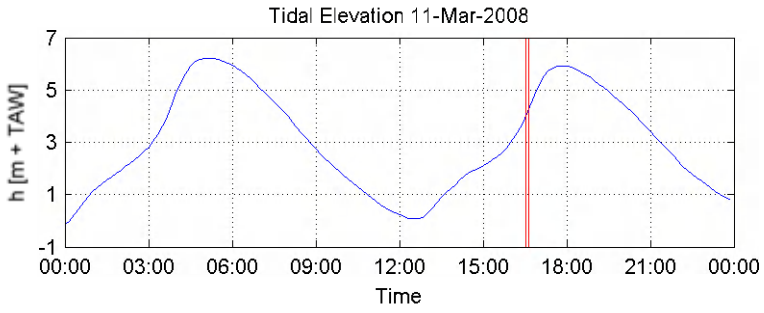
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3063Ktlr_sub.csv	Location: Transect K









HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

16:32 - 16:38

Time after HW [HH:MM]

-1:14

Data Processed by: IMDC

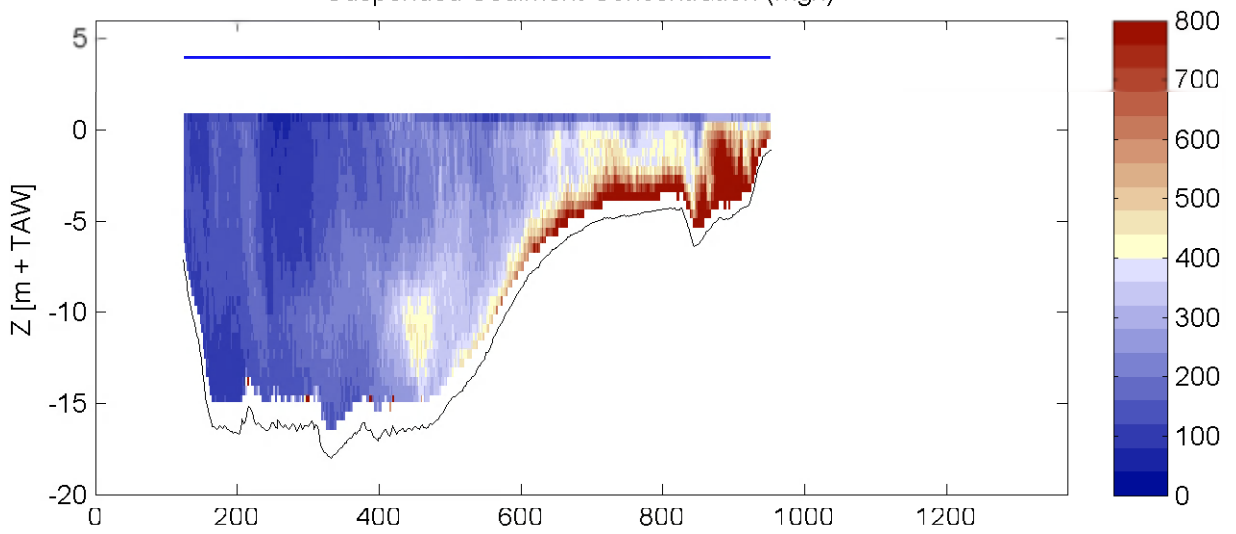
In association with :

I/RA/11283/07.089/MSA

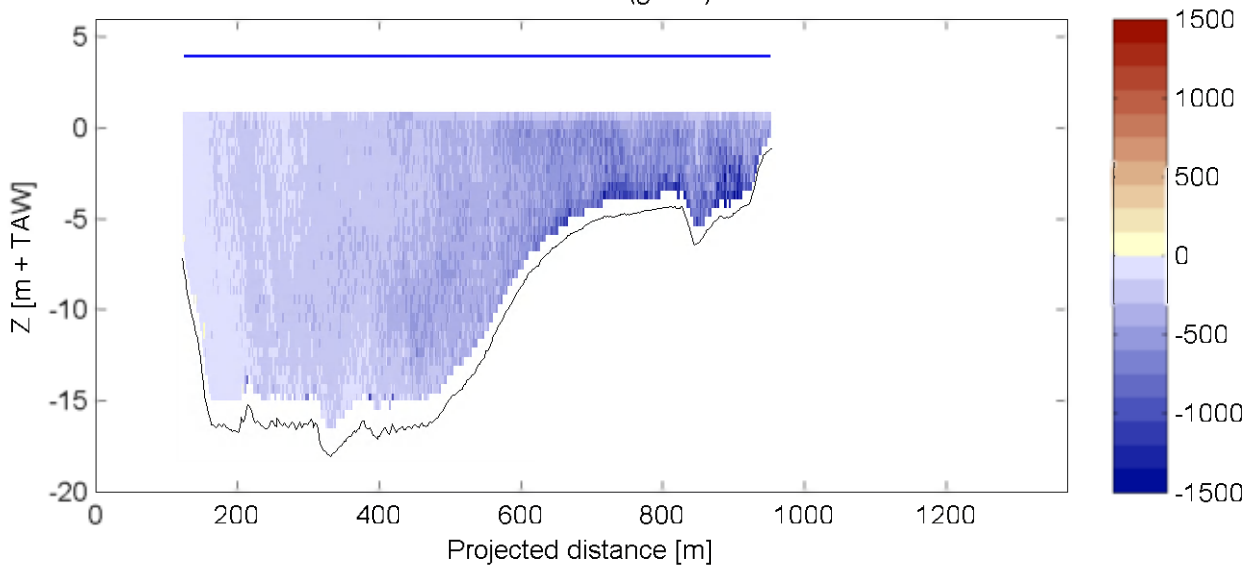
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3063Ktlr_sub.csv	Location: Transect K

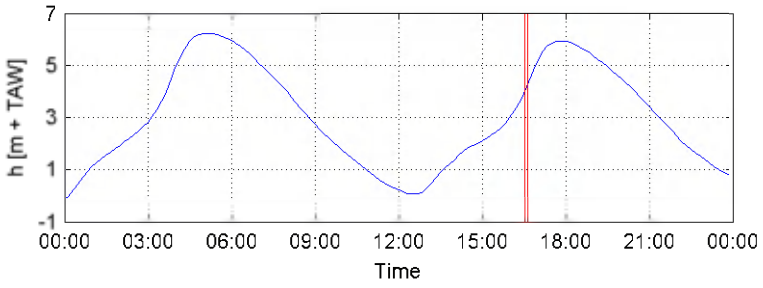
Suspended Sediment Concentration (mg/l)



Sediment Flux (g/sm²)



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
16:32 - 16:38

Time after HW [HH:MM]
-1:14

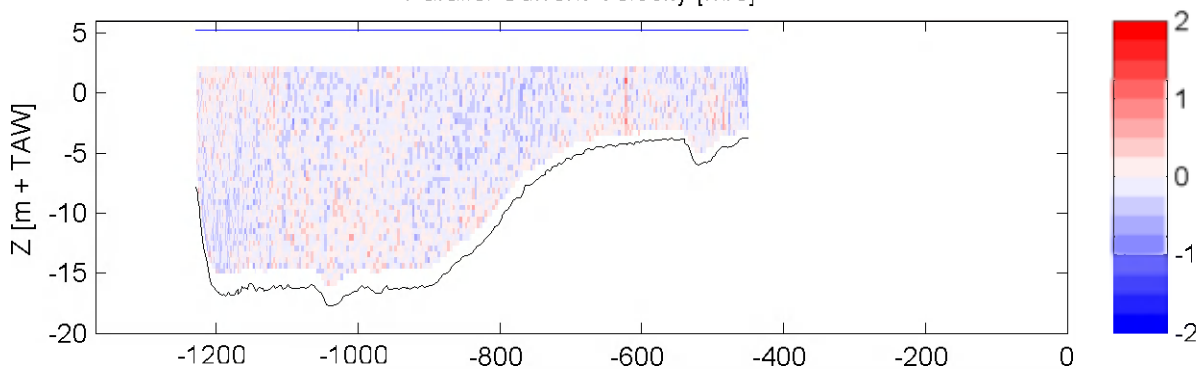
Data Processed by: IMDC
In association with : WL | delft hydraulics, GEMS

I/RA/11283/07.089/MSA

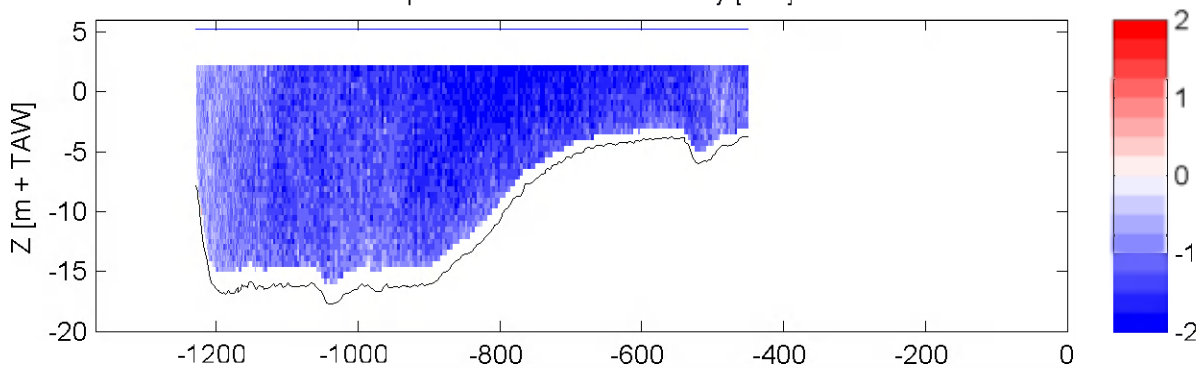
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3065Ktrl_sub.csv	Location: Transect K

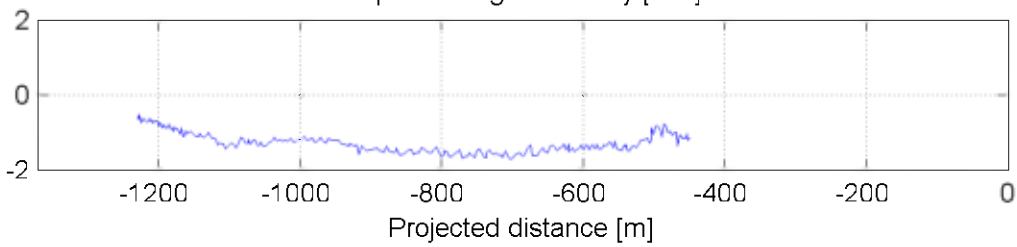
Parallel Current Velocity [m/s]



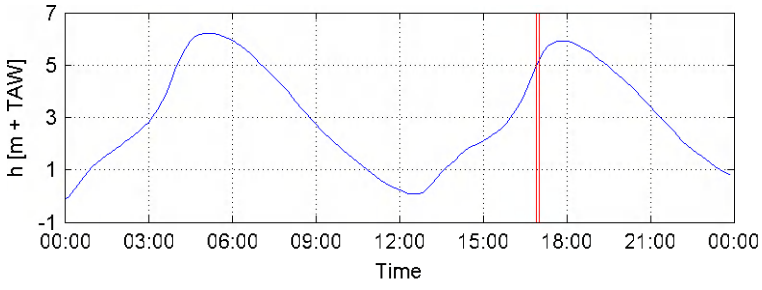
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
16:55 - 17:00

Time after HW [HH:MM]
-0:51

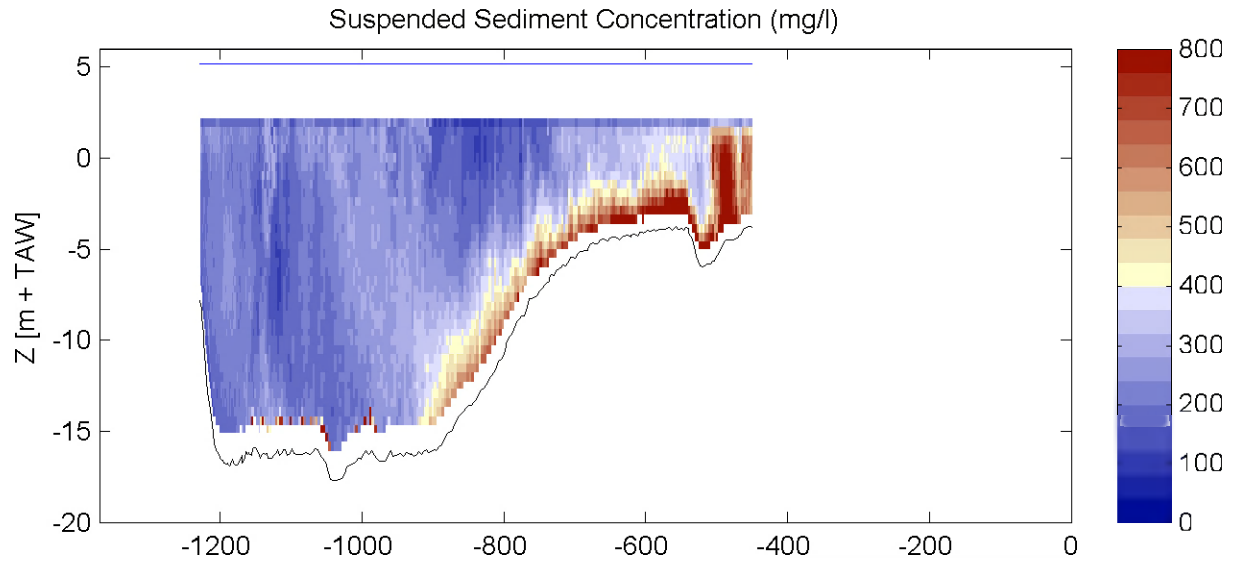
Data Processed by:

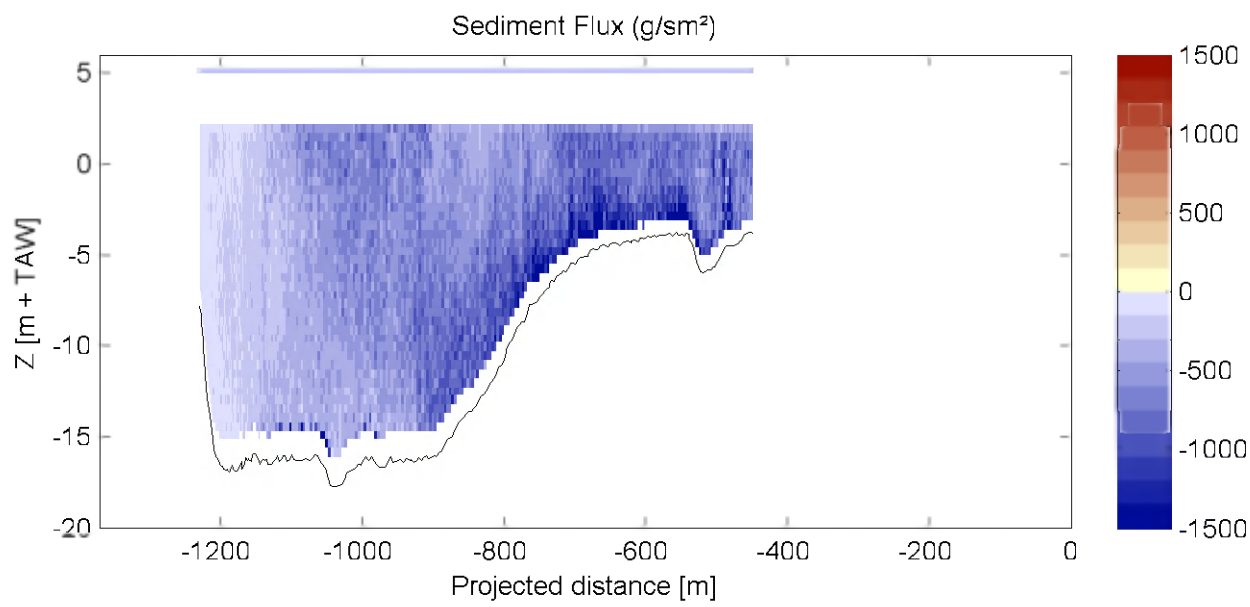
In association with :

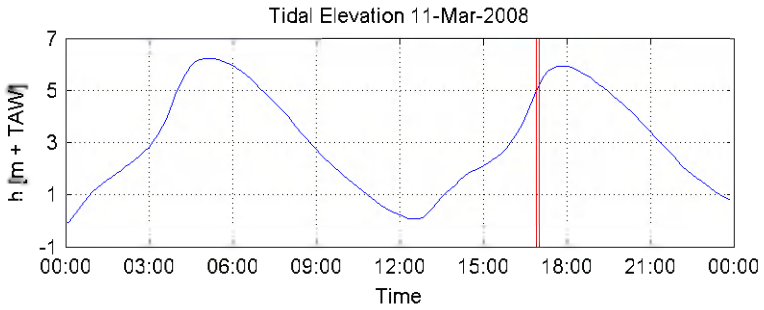
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3065Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

16:55 - 17:00

Time after HW [HH:MM]

-0:51

Data Processed by: IMDC

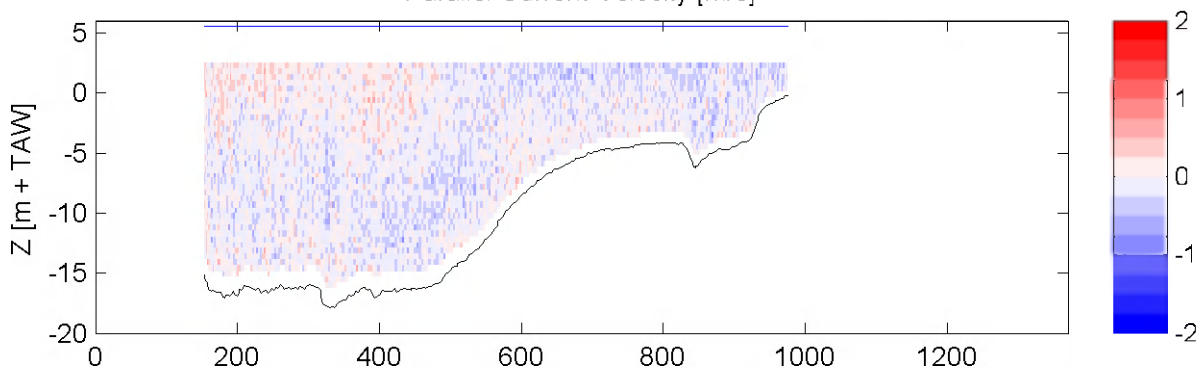
In association with : WL | Delft Hydraulics, GEMS

I/RA/11283/07.089/MSA

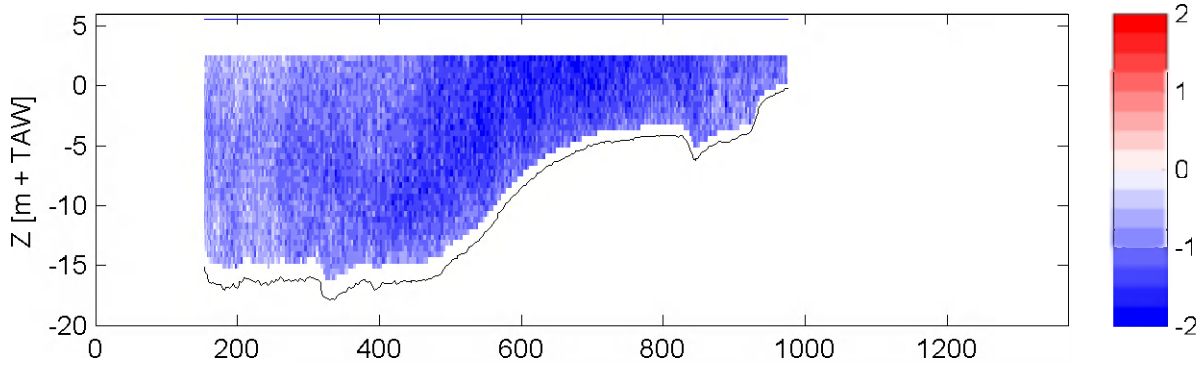
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3067Ktlr_sub.csv	Location: Transect K

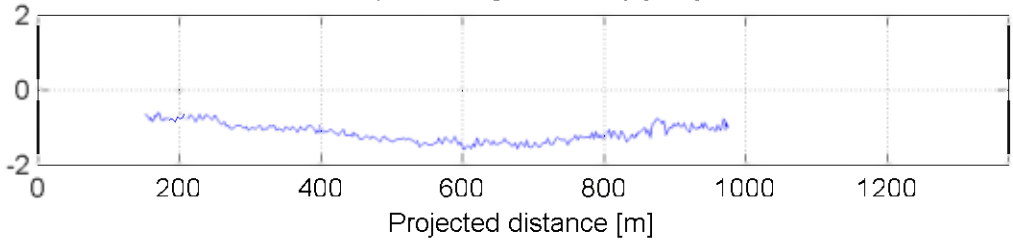
Parallel Current Velocity [m/s]



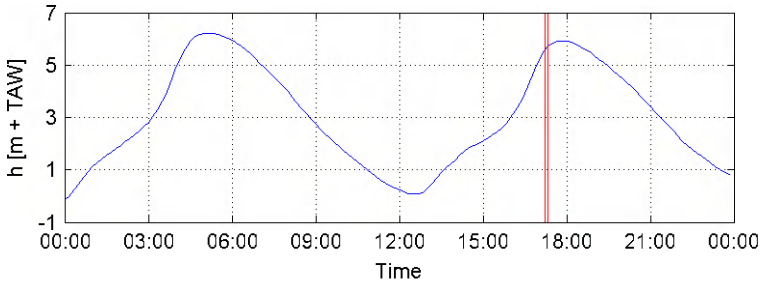
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
17:14 - 17:19

Time after HW [HH:MM]
-0:33

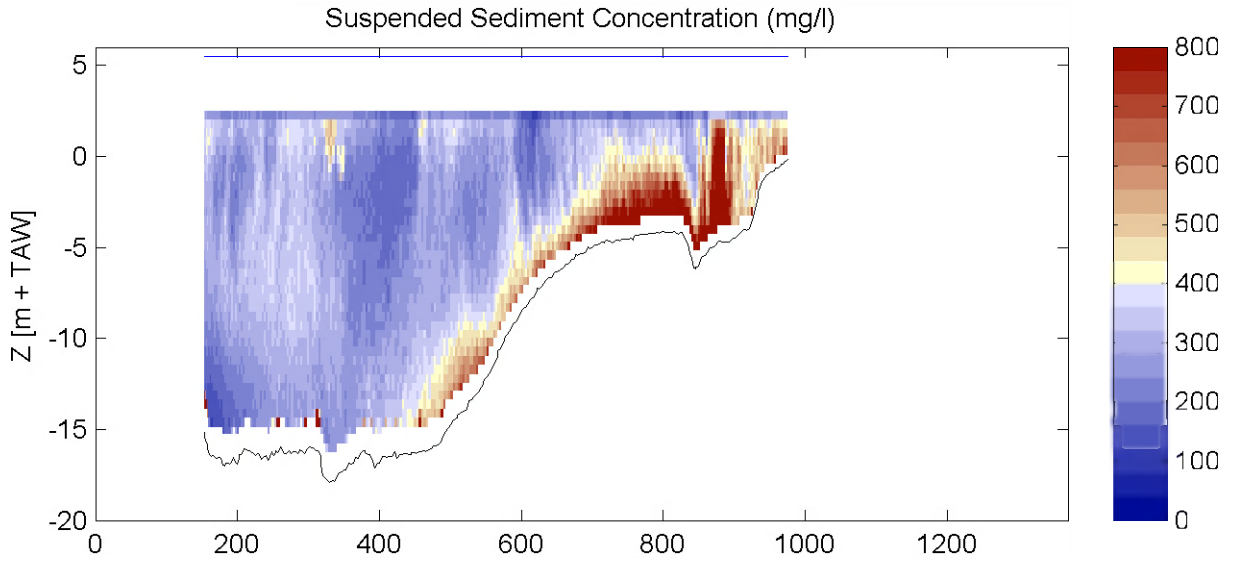
Data Processed by: IMDC

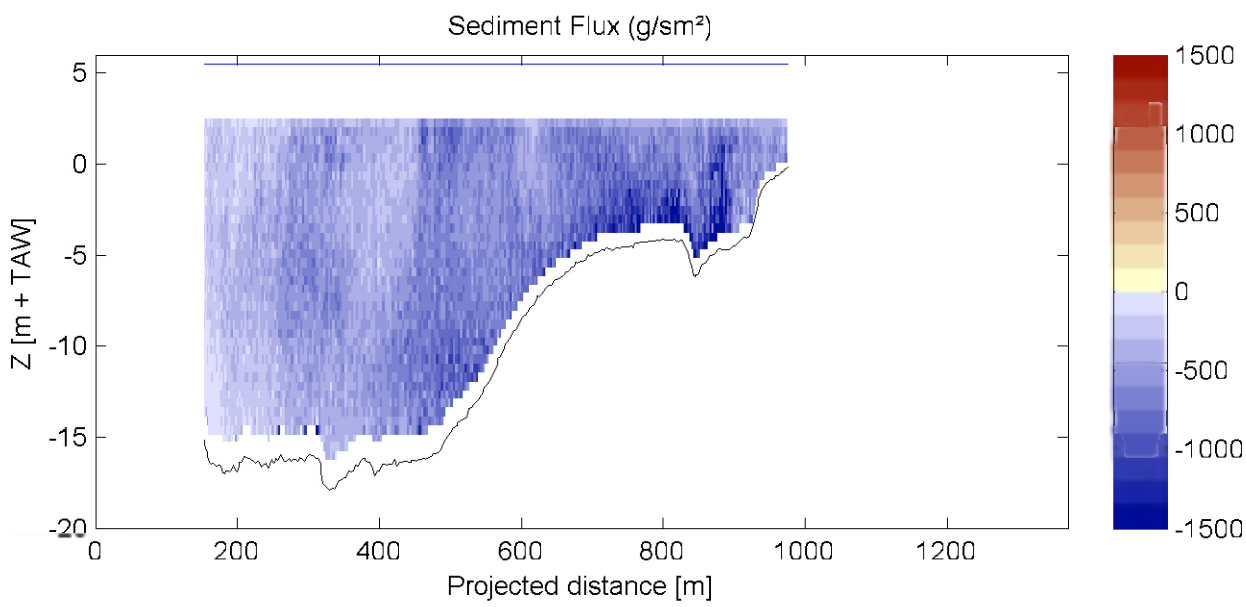
In association with :

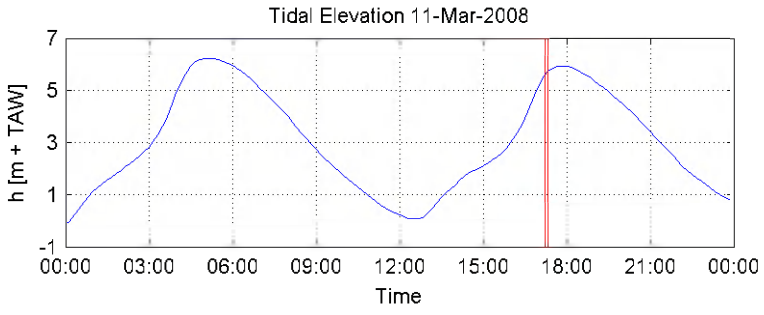
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3067Ktlr_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

17:14 - 17:19

Time after HW [HH:MM]

-0:33

Data Processed by: IMDC

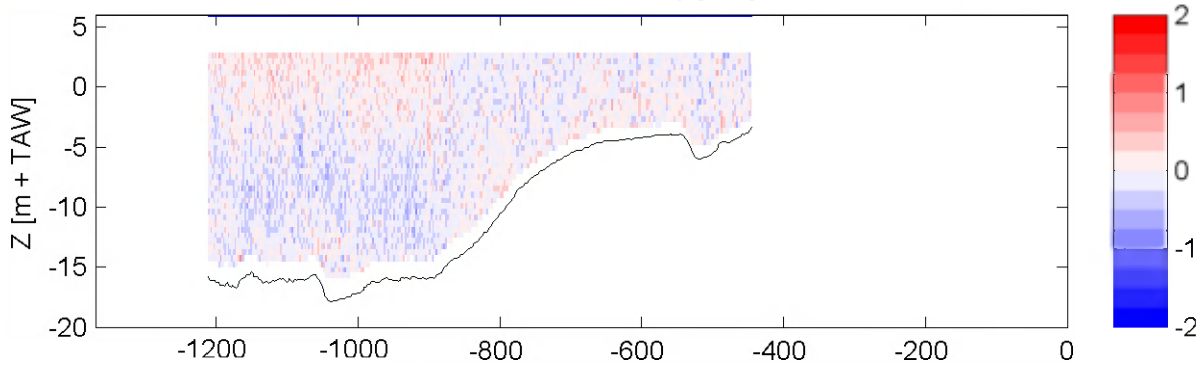
In association with : WL | delft hydraulics, GEMS

I/RA/11283/07.089/MSA

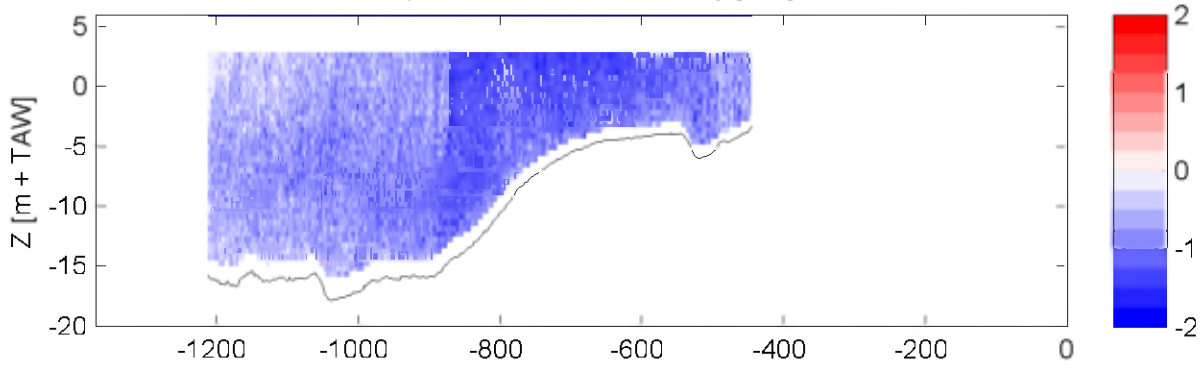
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3069Ktrl_sub.csv	Location: Transect K

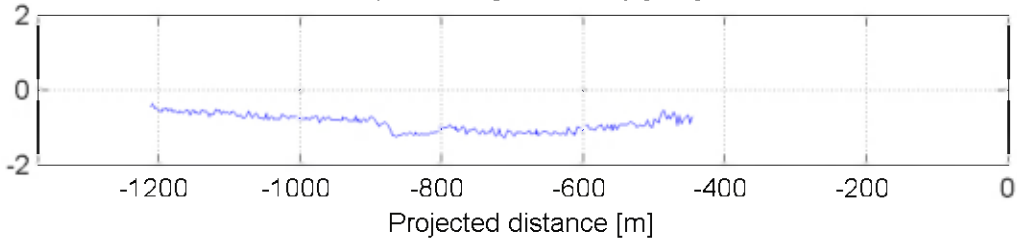
Parallel Current Velocity [m/s]



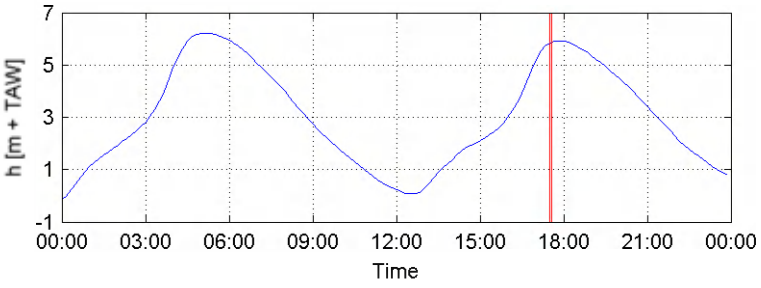
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

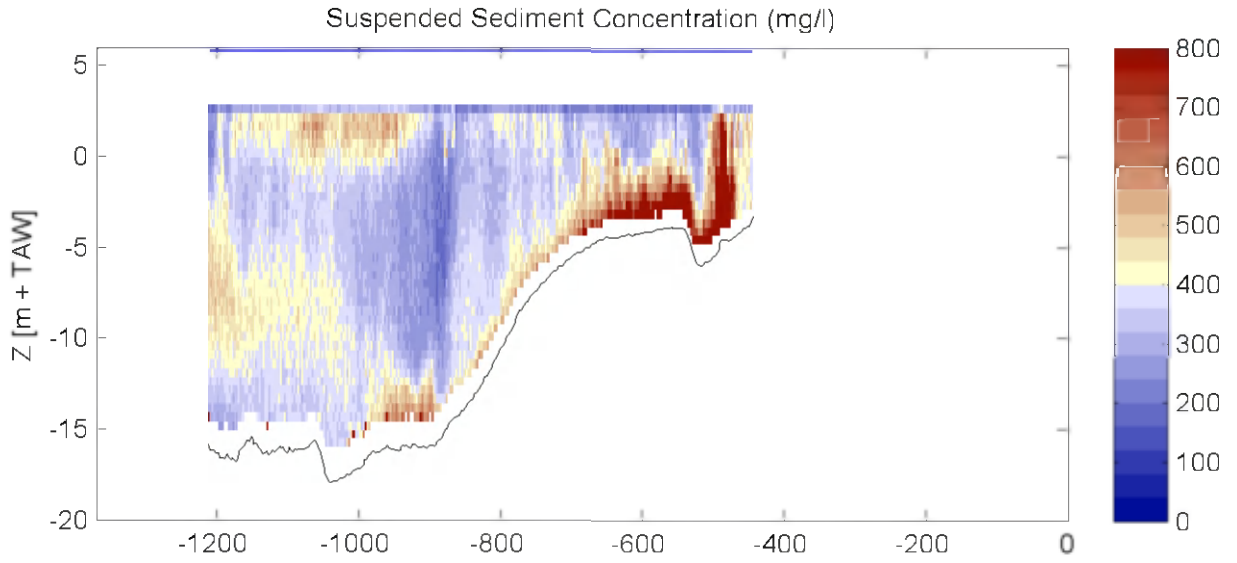
Date / Time [MET] :
11-Mar-2008
17:29 - 17:34

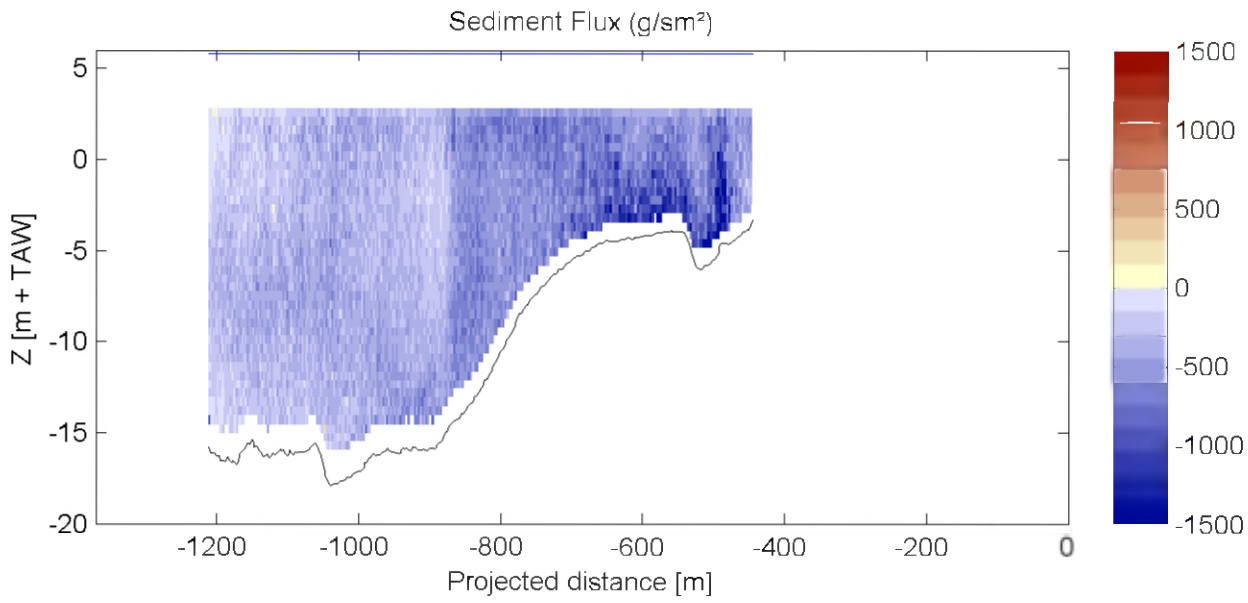
Time after HW [HH:MM]
-0:18

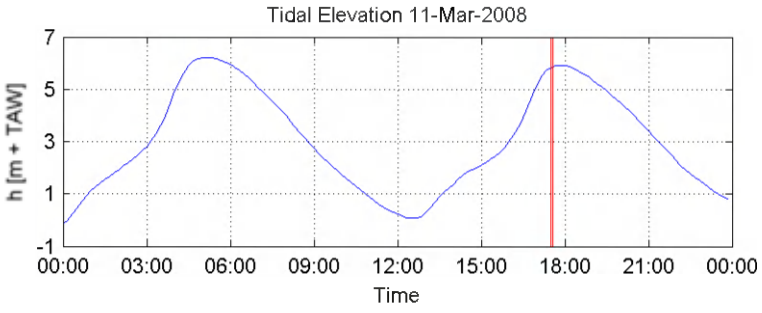
Data Processed by: IMDC
In association with :
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3069Ktrl_sub.csv	Location: Transect K







HW/LW: 05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

17:29 - 17:34

Time after HW [HH:MM]

-0:18

Data Processed by:

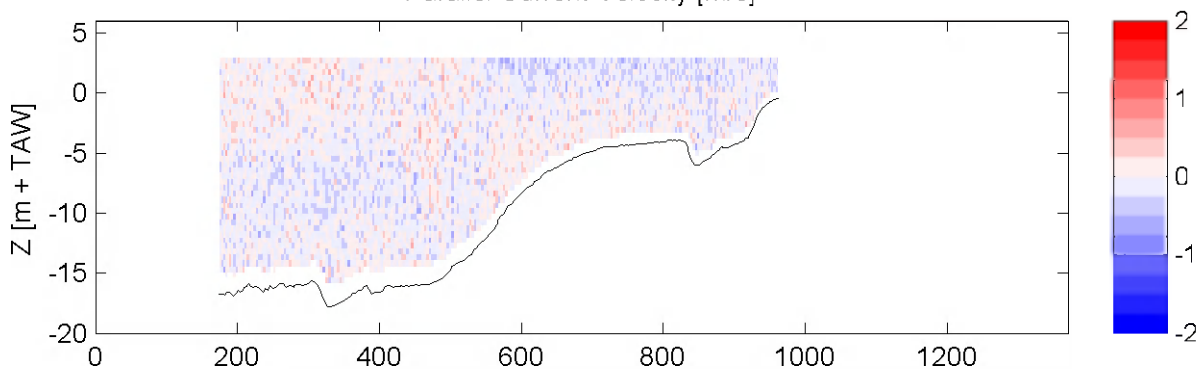
In association with :

I/RA/11283/07.089/MSA

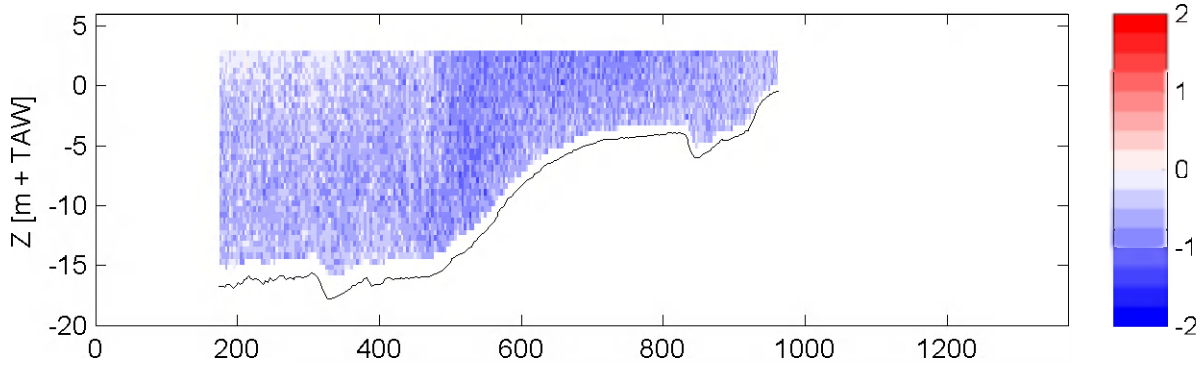
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3071Ktlr_sub.csv	Location: Transect K

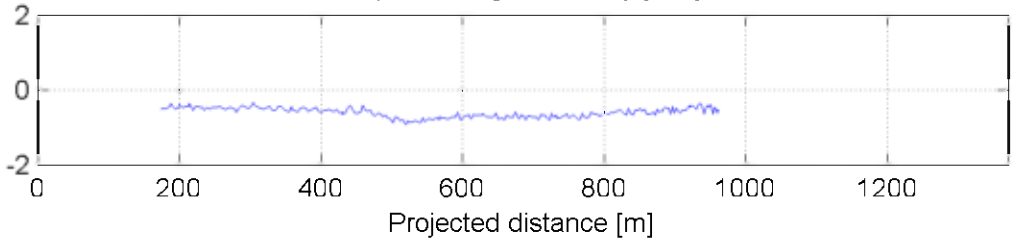
Parallel Current Velocity [m/s]



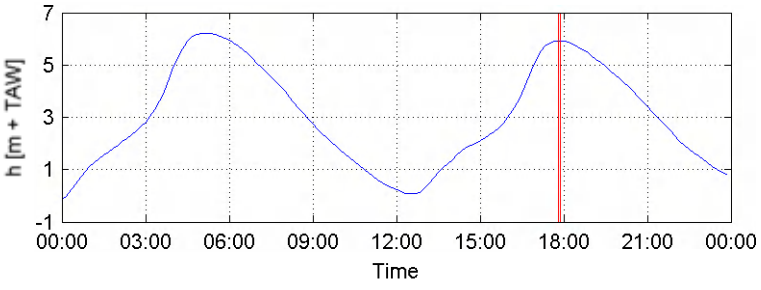
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
17:48 - 17:52

Time after HW [HH:MM]
0:00

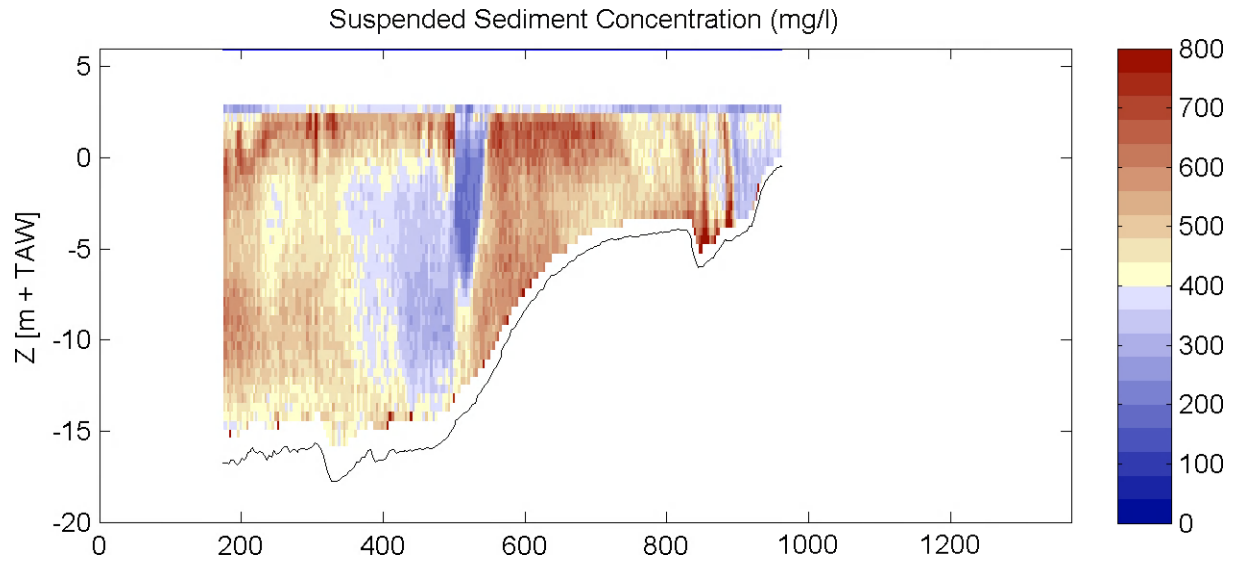
Data Processed by: IMDC

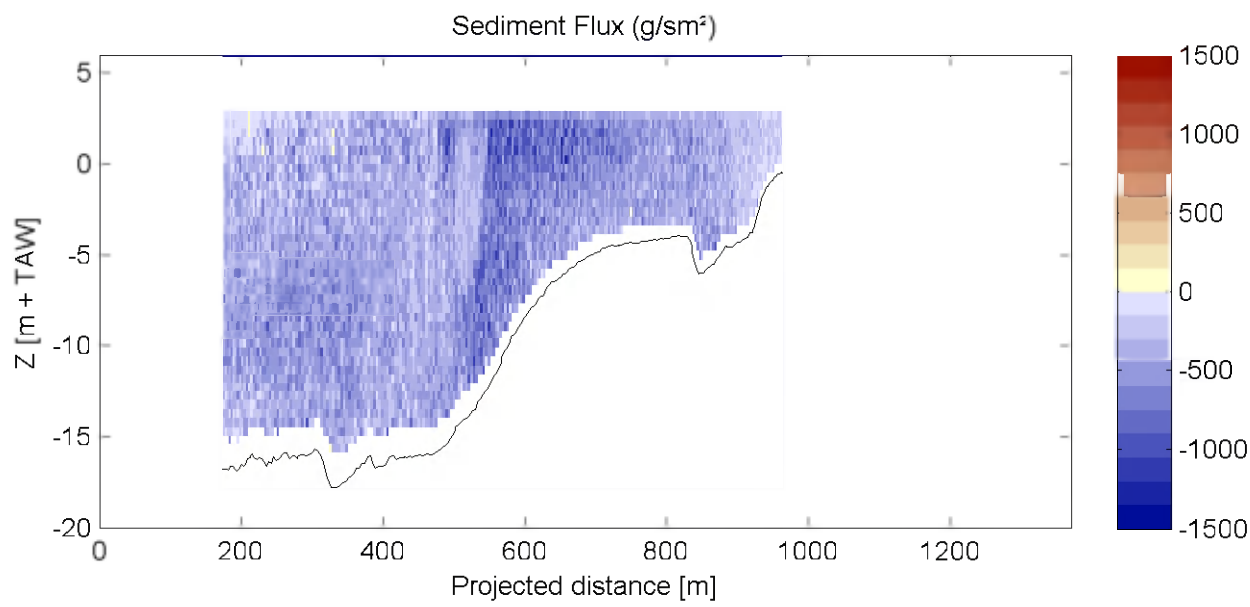
In association with :

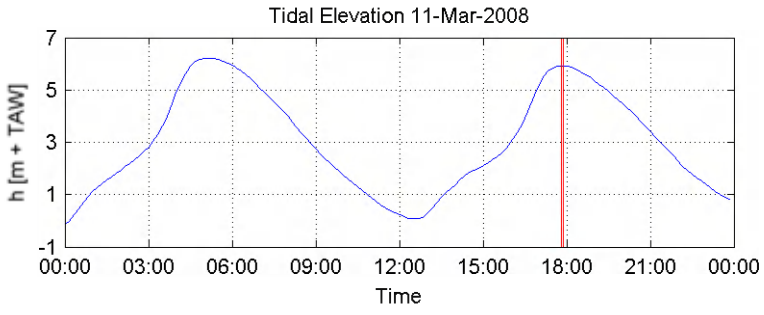
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3071Ktlr_sub.csv	Location: Transect K







HW/LW: 05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

17:48 - 17:52

Time after HW [HH:MM]

0:00

Data Processed by: IMDC

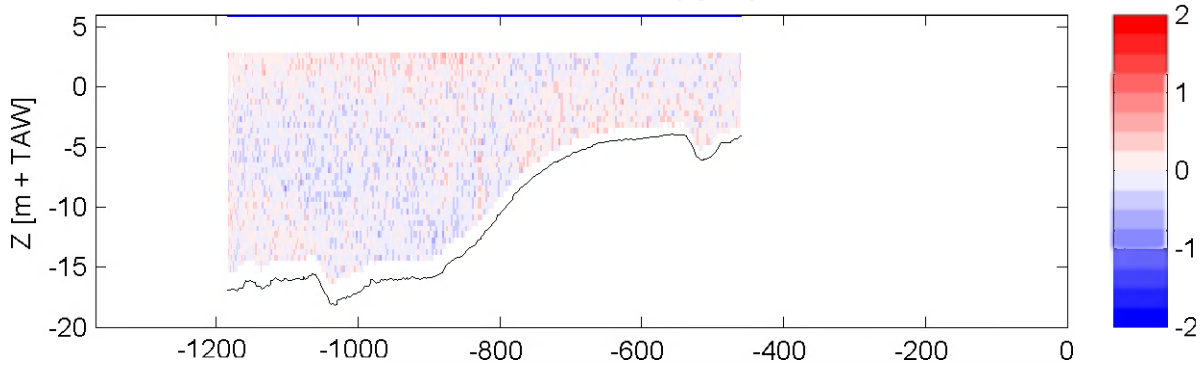
In association with :

I/RA/11283/07.089/MSA

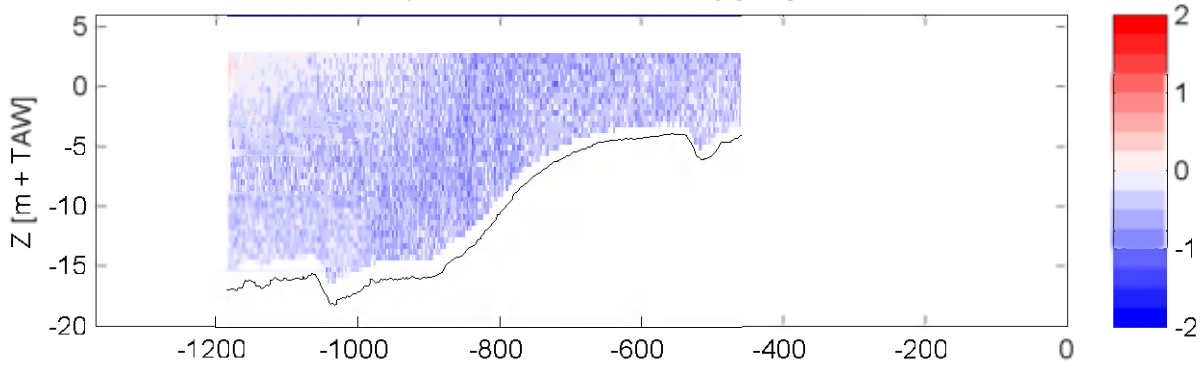
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3073Ktrl_sub.csv	Location: Transect K

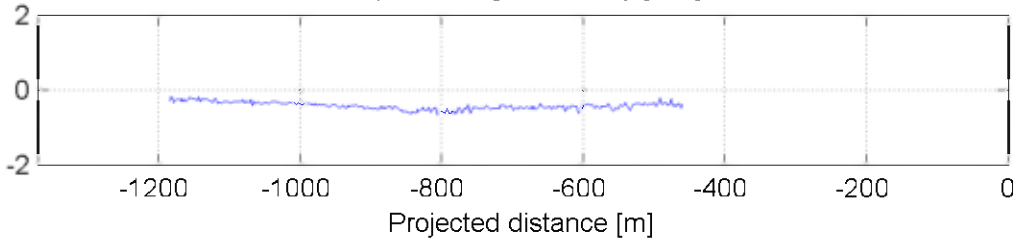
Parallel Current Velocity [m/s]



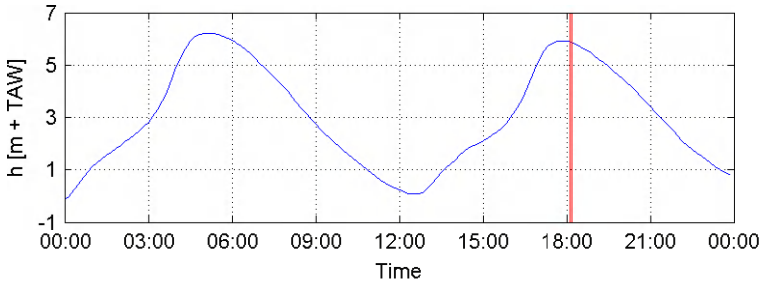
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW: 05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

18:06 - 18:11

Time after HW [HH:MM]

0:18

Data Processed by: IMDC

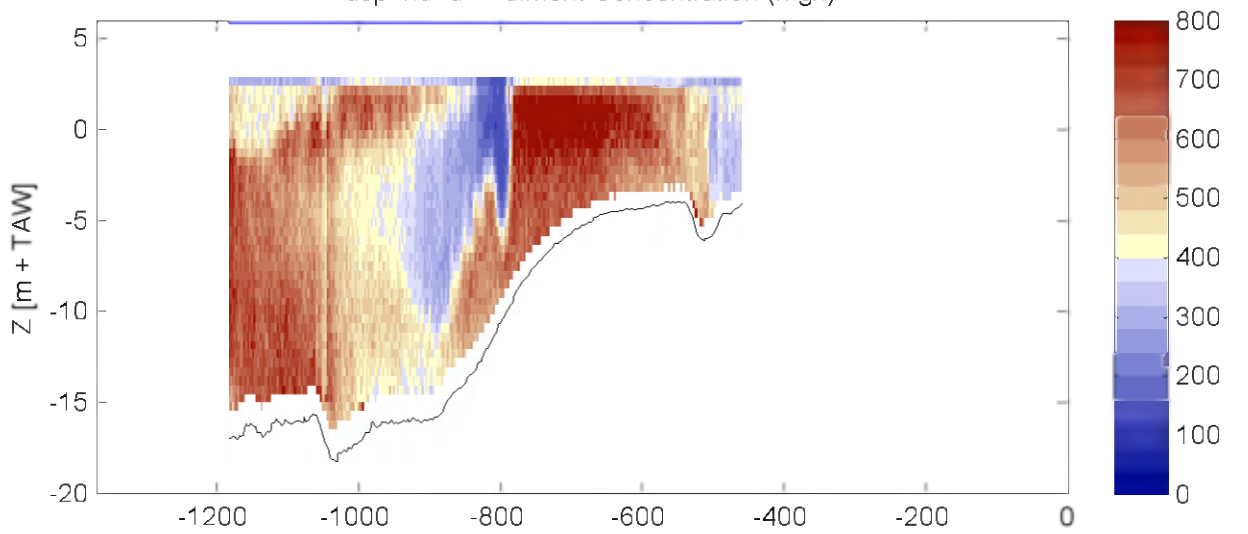
In association with :

I/RA/11283/07.089/MSA

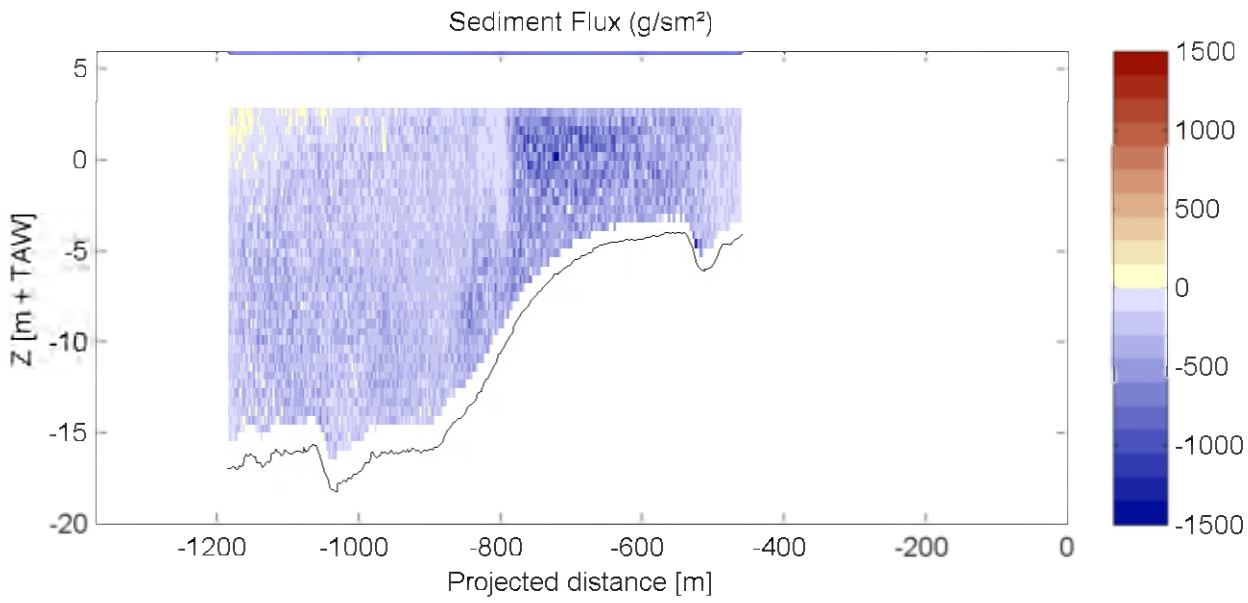
Through Tide Measurement Sediview on 11/03/2008 - Transect K

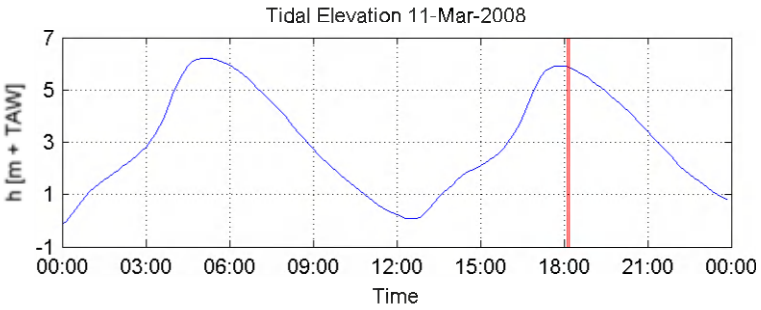
11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3073Ktrl_sub.csv	Location: Transect K

Suspended Sediment Concentration (mg/l)



Sediment Flux (g/sm²)





HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

18:06 - 18:11

Time after HW [HH:MM]

0:18

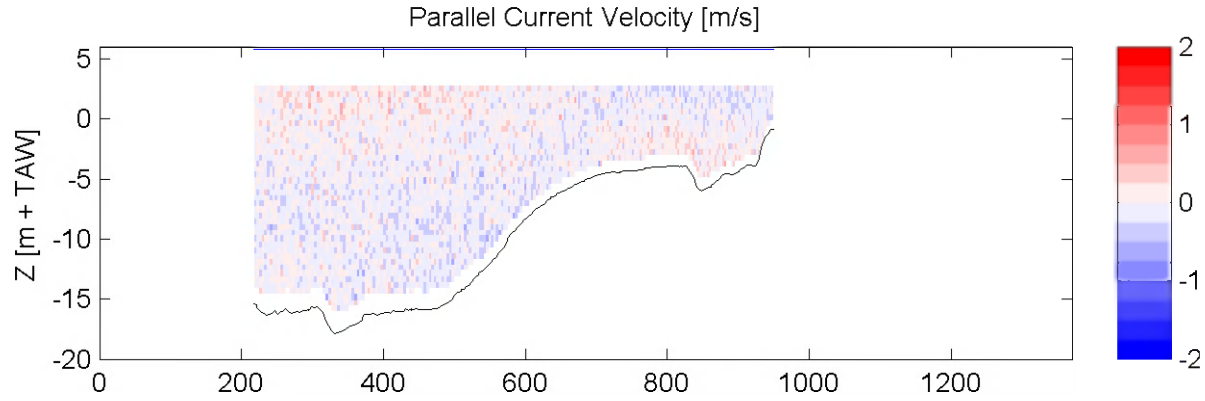
Data Processed by: IMDC

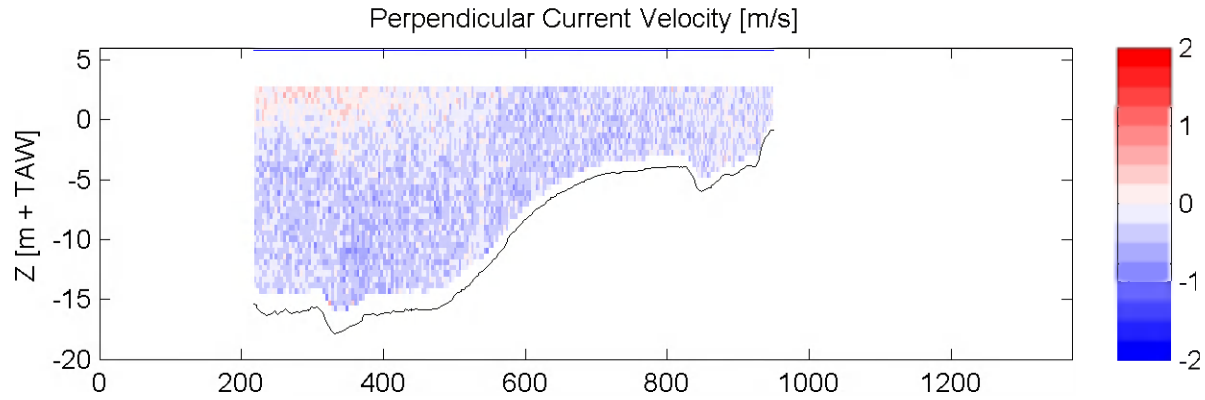
In association with :

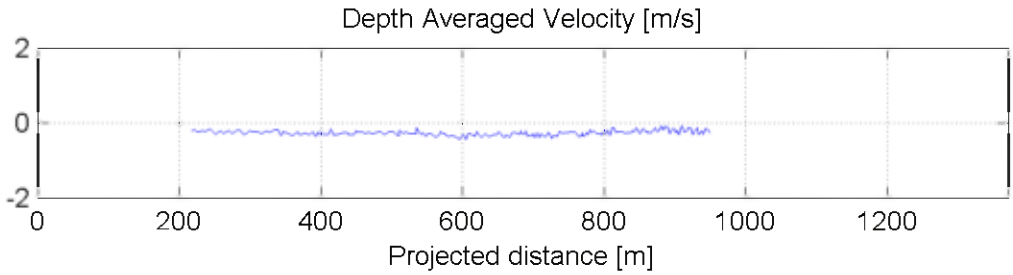
I/RA/11283/07.089/MSA

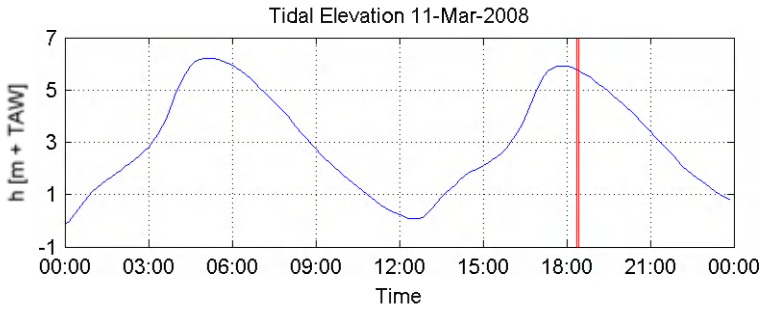
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3075Ktlr_sub.csv	Location: Transect K









HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
18:22 - 18:26

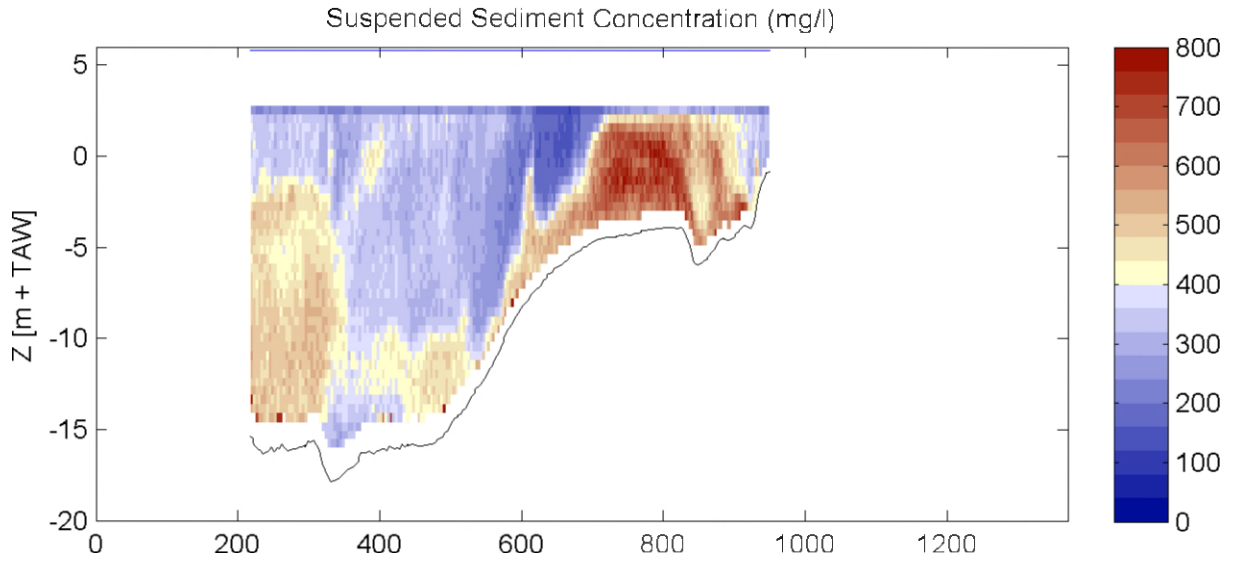
Time after HW [HH:MM]
0:34

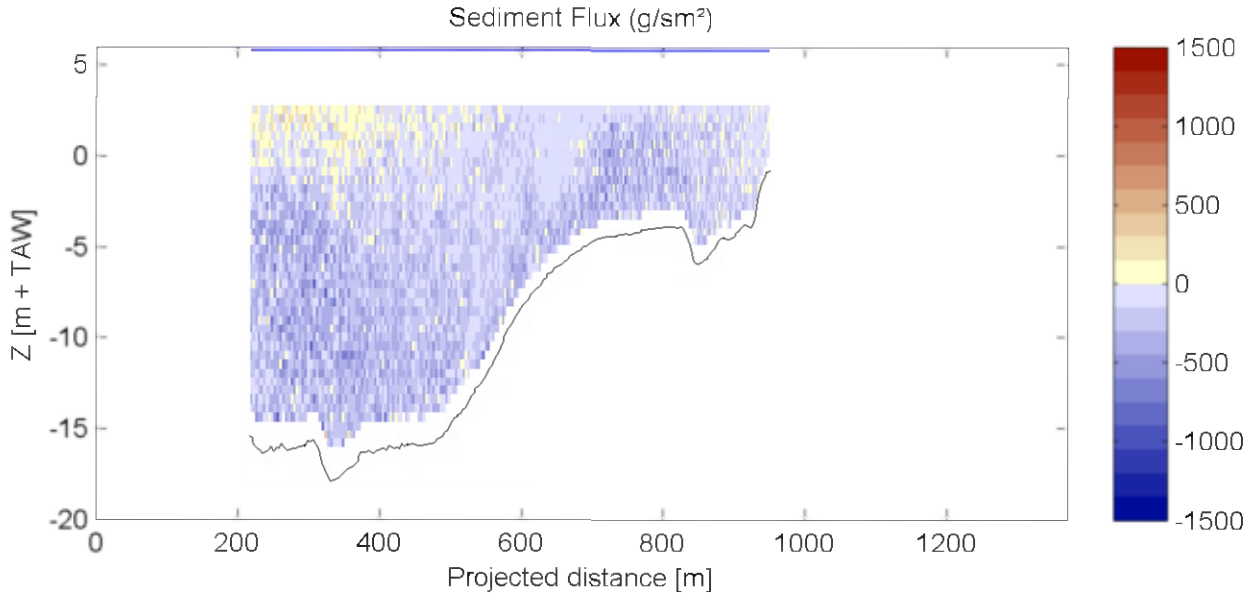
Data Processed by: IMDC
In association with :

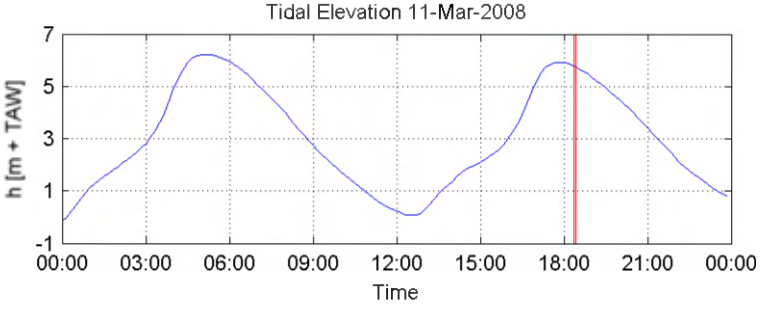
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3075Ktlr_sub.csv	Location: Transect K







HW/LW: 05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

18:22 - 18:26

Time after HW [HH:MM]

0:34

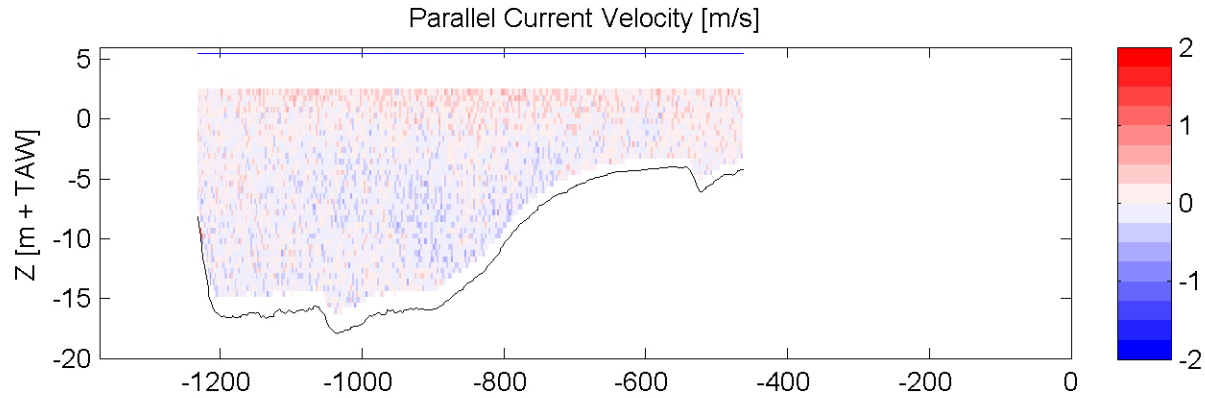
Data Processed by: IMDC

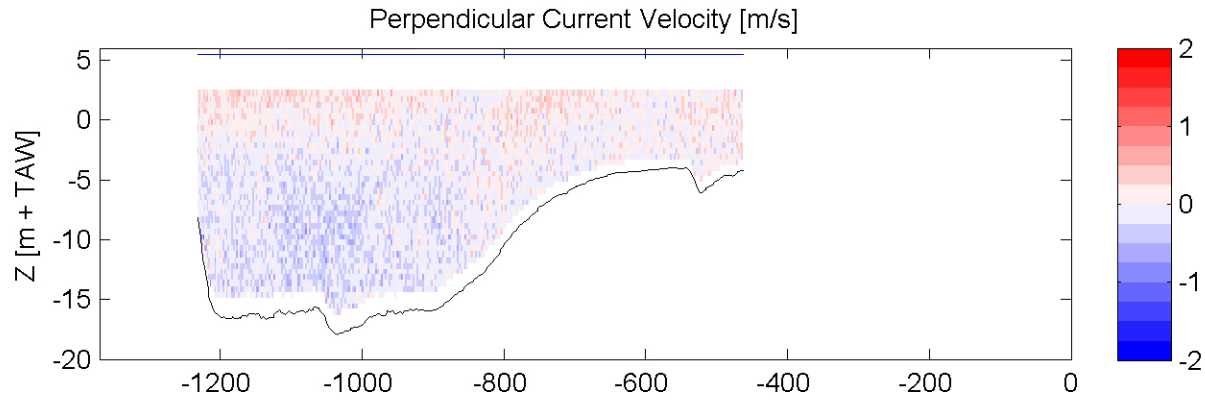
In association with :

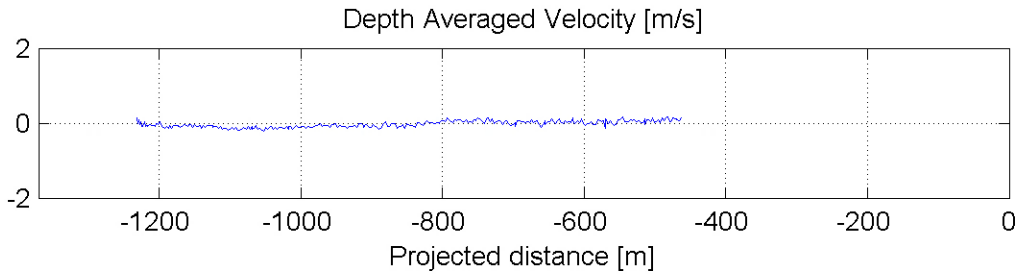
I/RA/11283/07.089/MSA

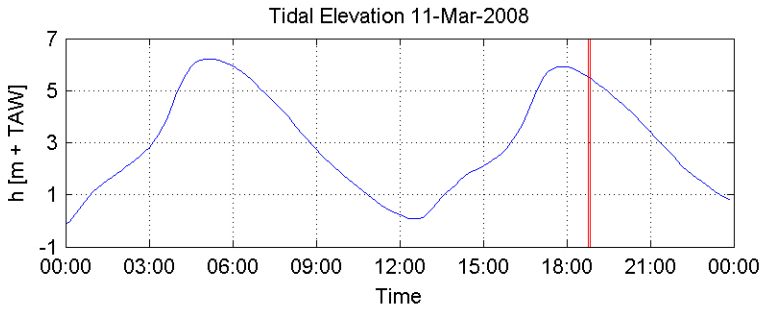
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3077Ktrl_sub.csv	Location: Transect K









HW/LW: 05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

18:46 - 18:51

Time after HW [HH:MM]

0:58

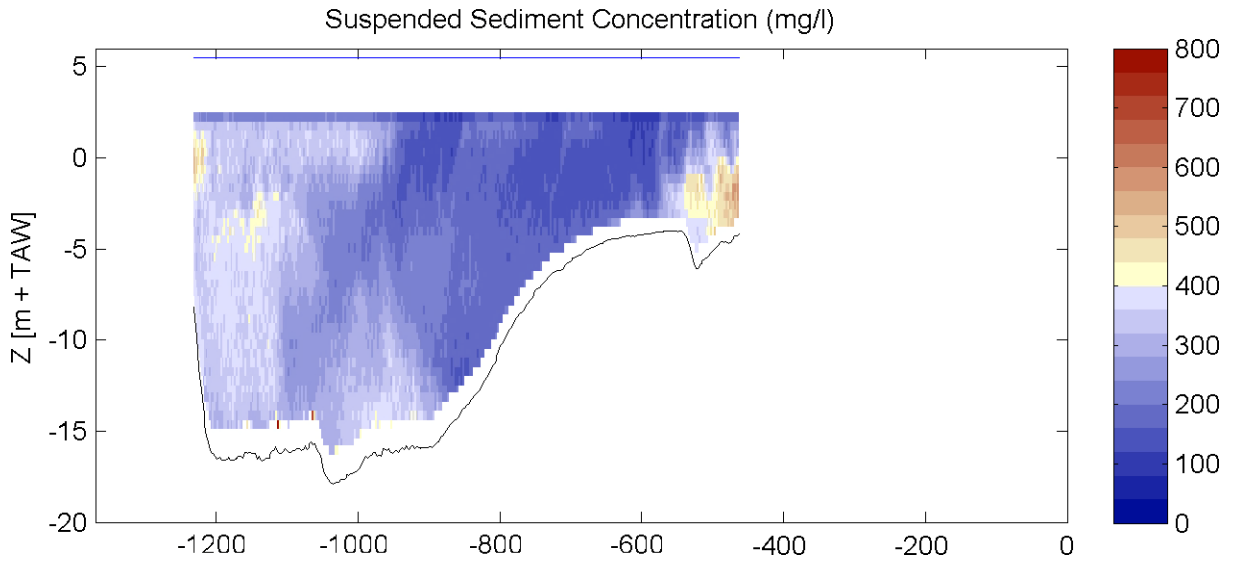
Data Processed by: IMDC

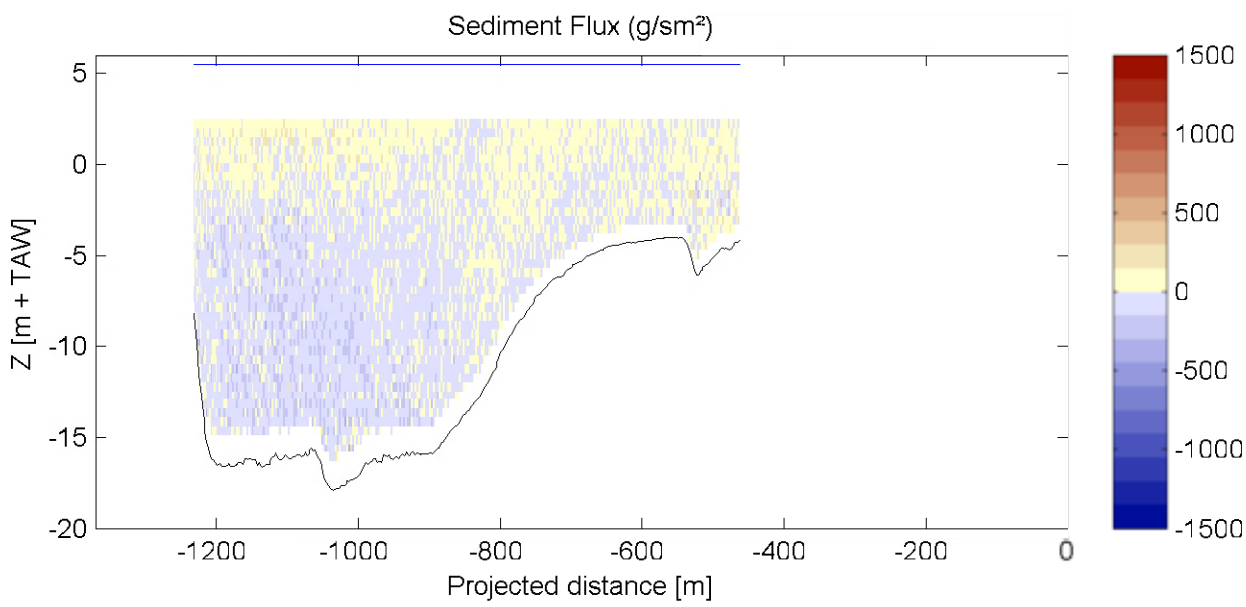
In association with : WL | delft hydraulics, GEMS International

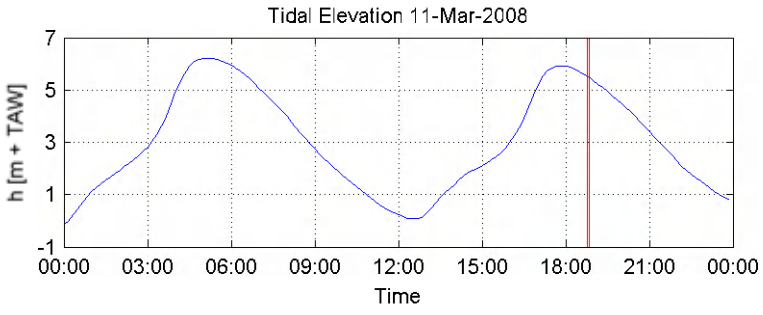
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3077Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :
11-Mar-2008
18:46 - 18:51

Time after HW [HH:MM]
0:58

Data Processed by: IMDC

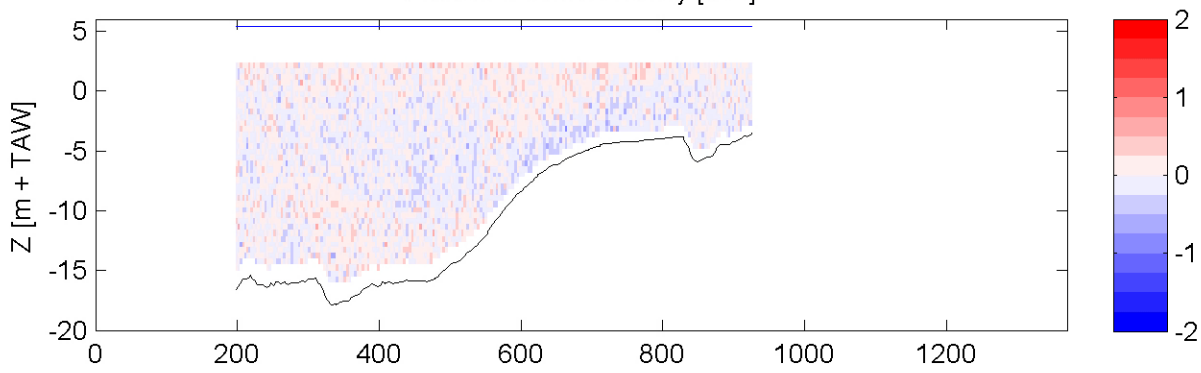
In association with :

I/RA/11283/07.089/MSA

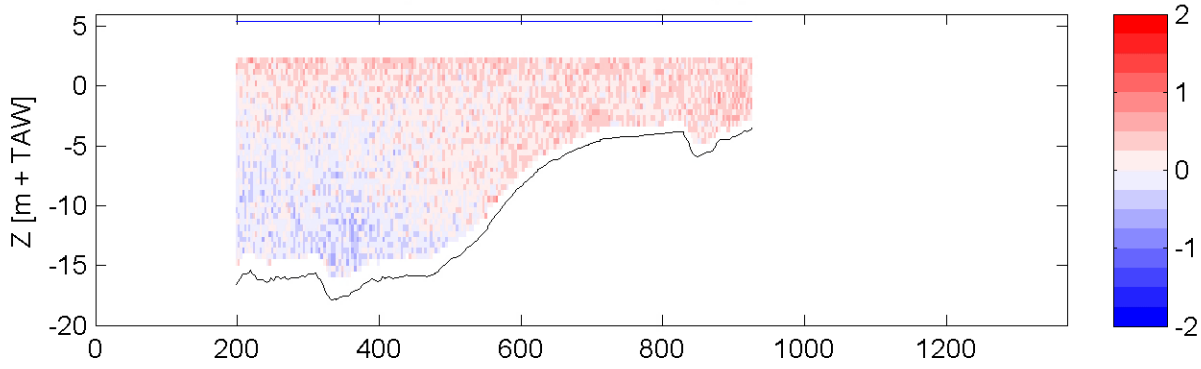
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3079Ktlr_sub.csv	Location: Transect K

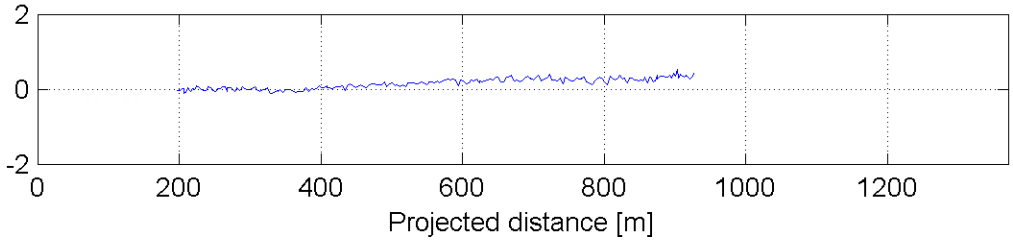
Parallel Current Velocity [m/s]



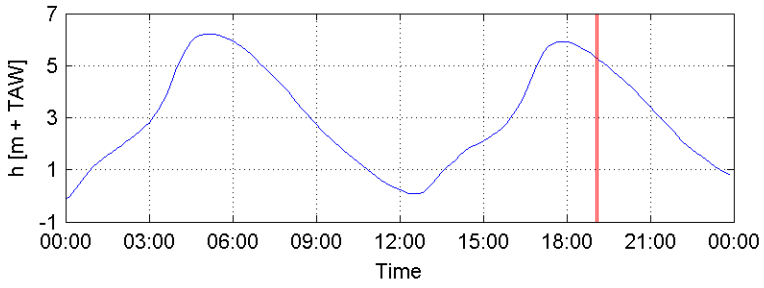
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

19:03 - 19:07

Time after HW [HH:MM]

1:15

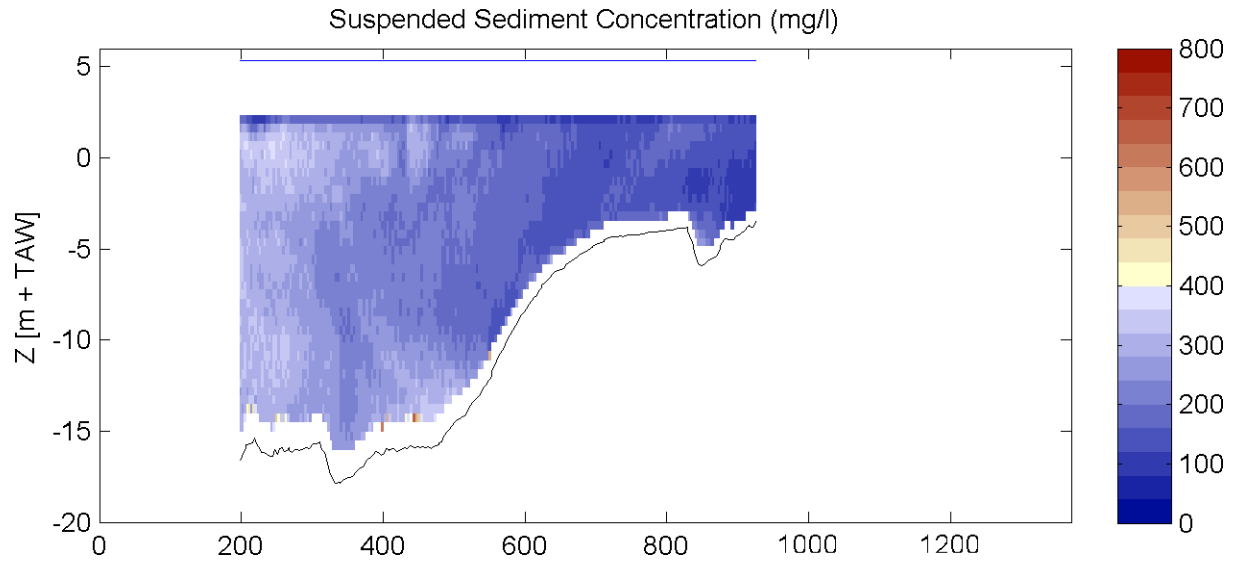
Data Processed by: IMDC

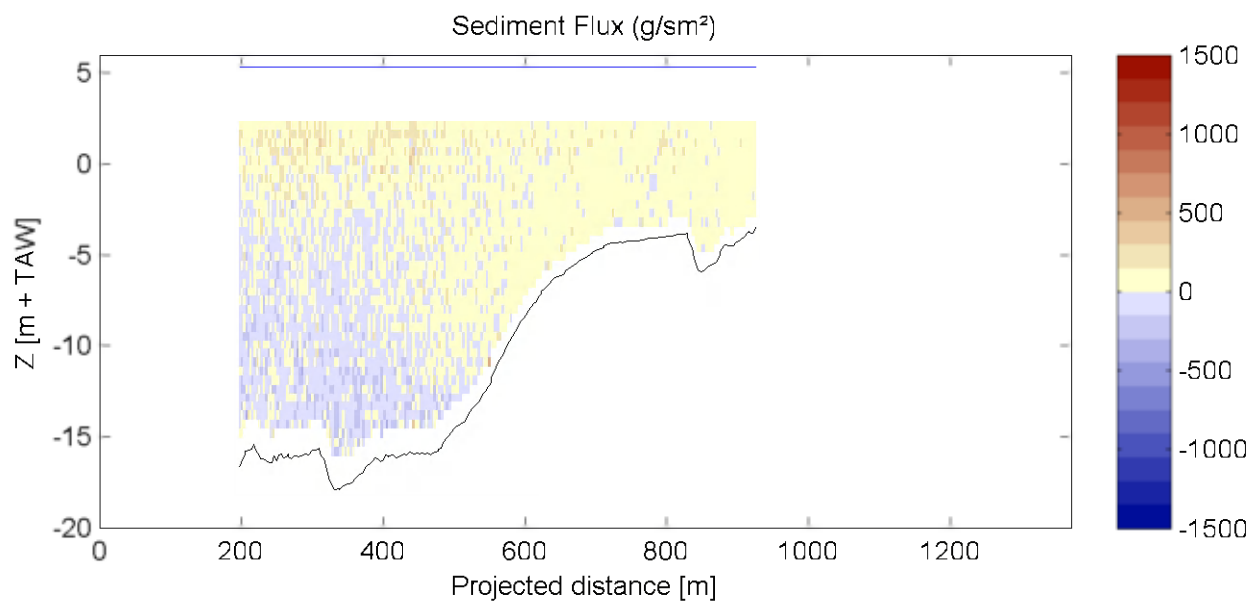
In association with : WL | delft hydraulics, GEMS International

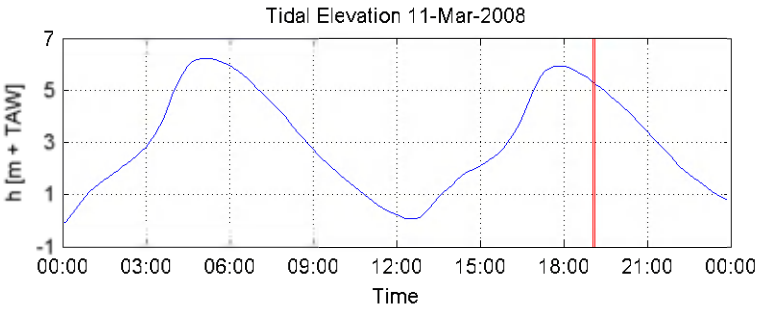
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3079Ktlr_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

19:03 - 19:07

Time after HW [HH:MM]

1:15

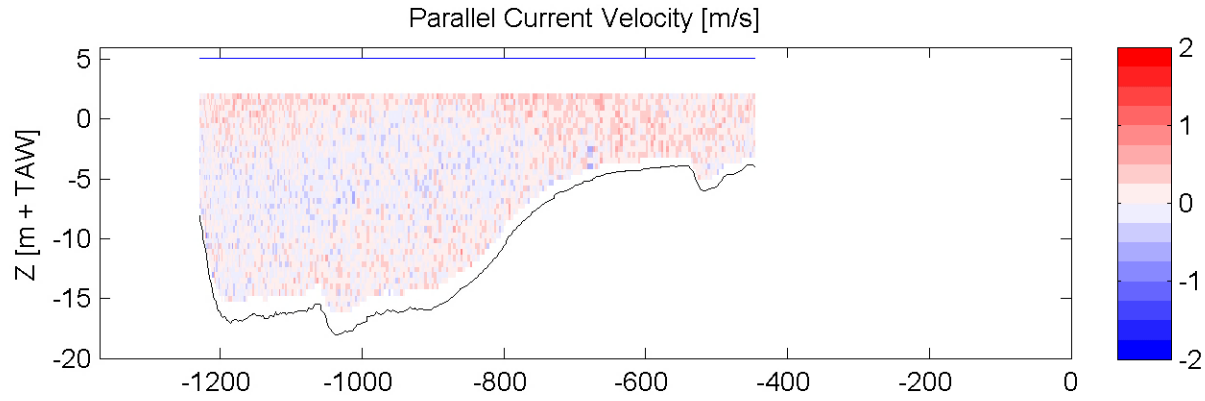
Data Processed by: IMDC

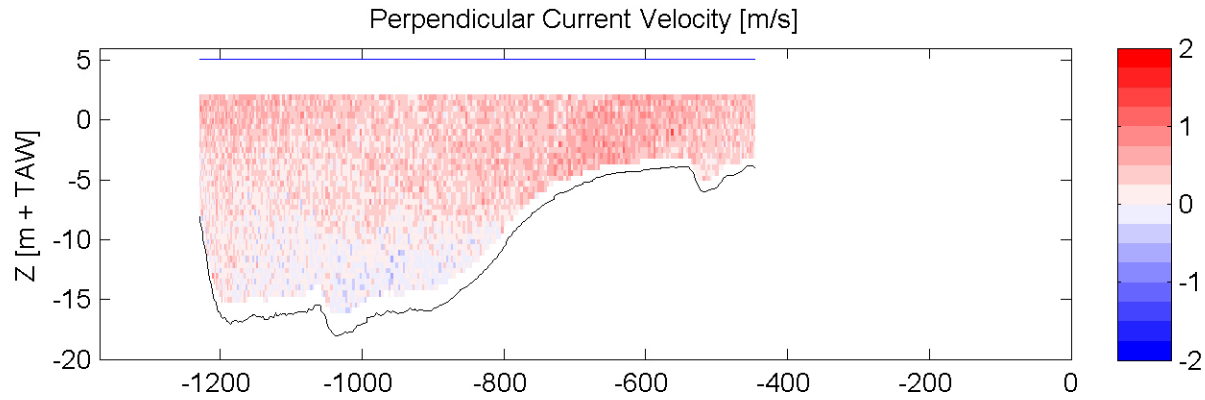
In association with :

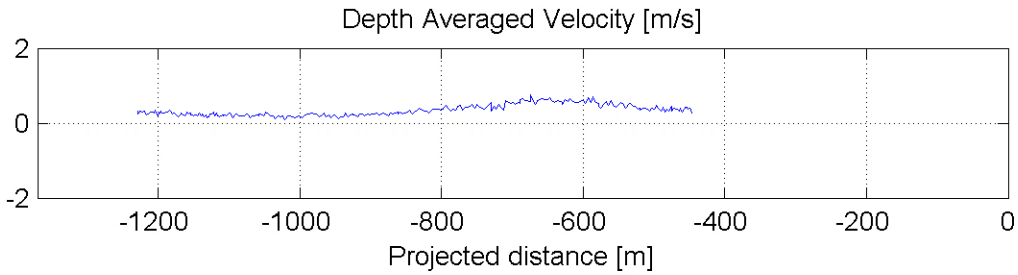
I/RA/11283/07.089/MSA

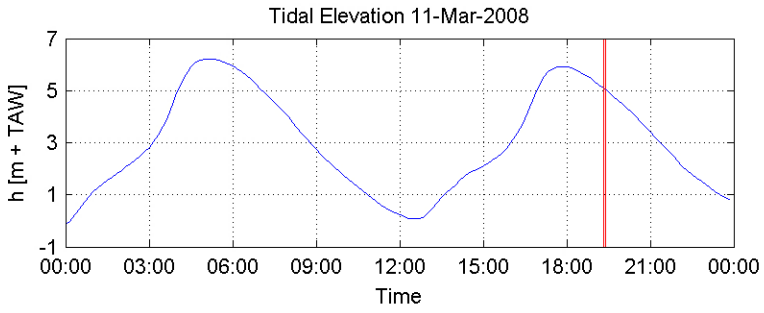
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3081Ktrl_sub.csv	Location: Transect K









HW/LW: 05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

19:19 - 19:24

Time after HW [HH:MM]

1:31

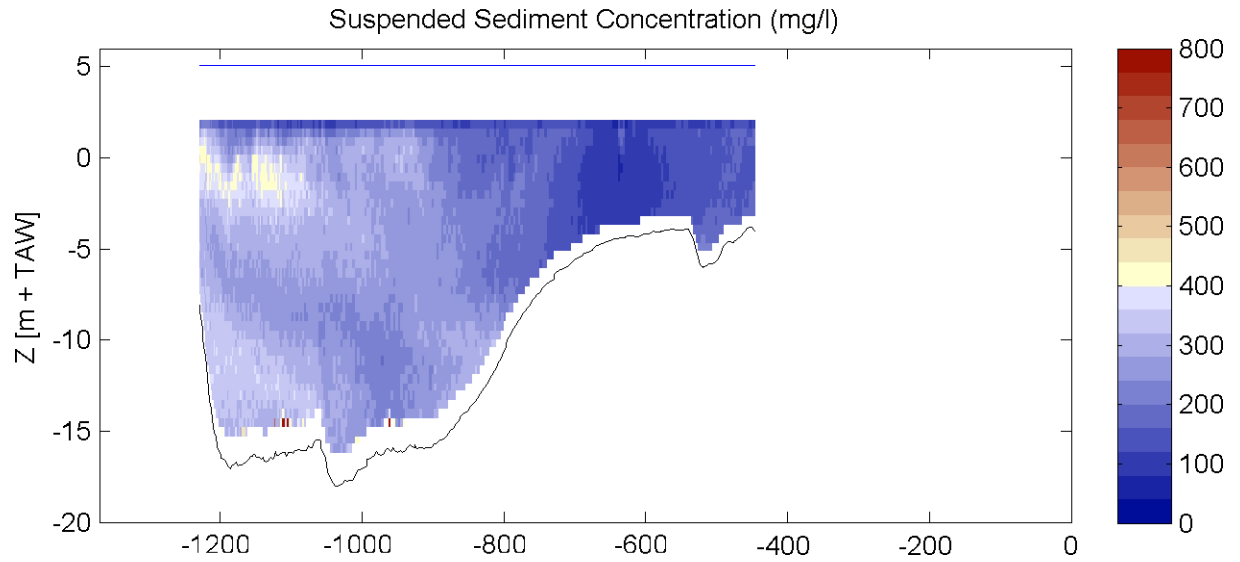
Data Processed by: IMDC

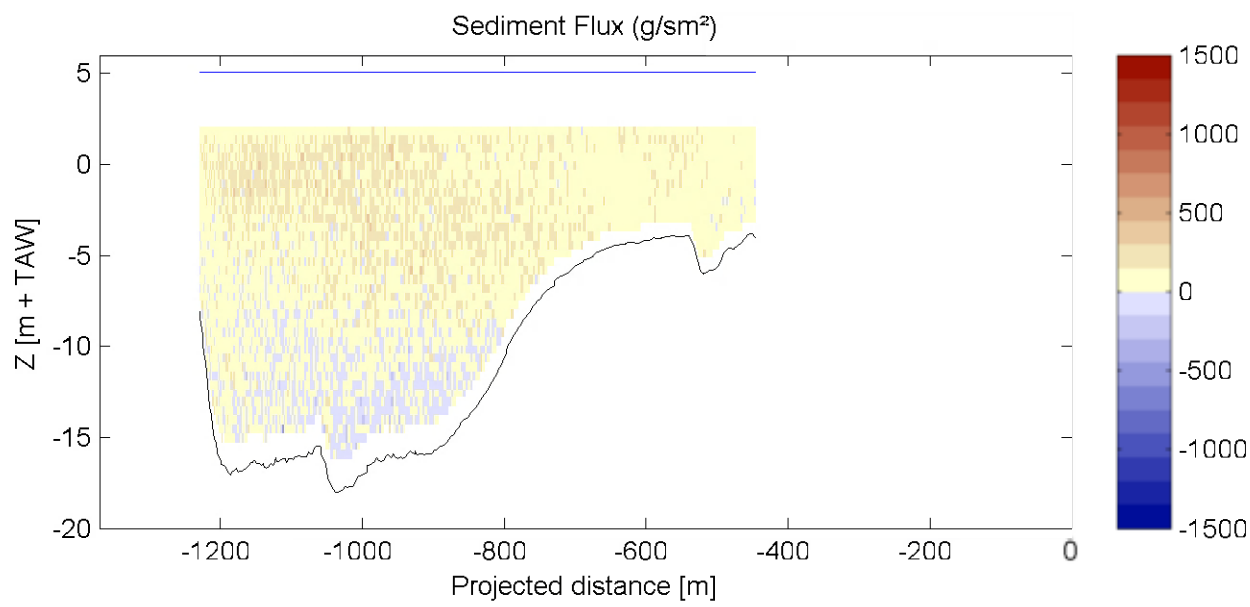
In association with : w.l | delft hydraulics, GEMS International

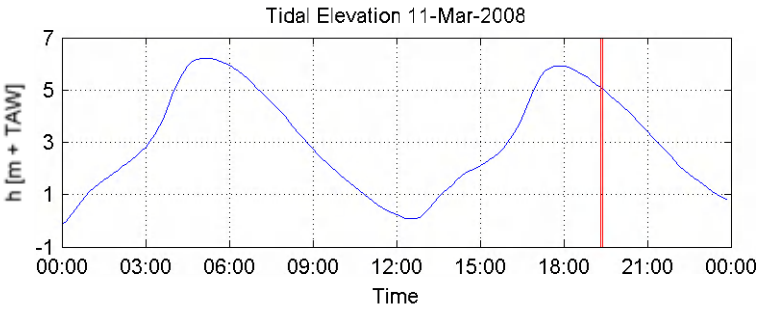
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3081Ktrl_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

19:19 - 19:24

Time after HW [HH:MM]

1:31

Data Processed by: IMDC

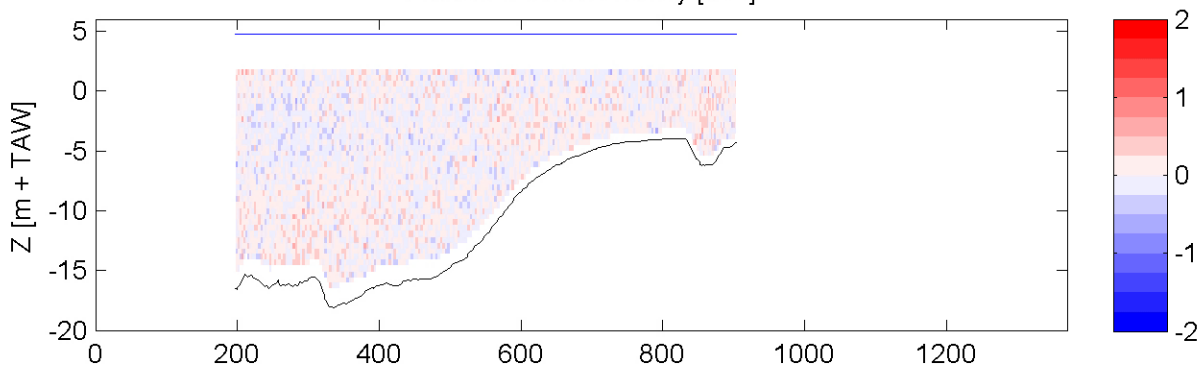
In association with :

I/RA/11283/07.089/MSA

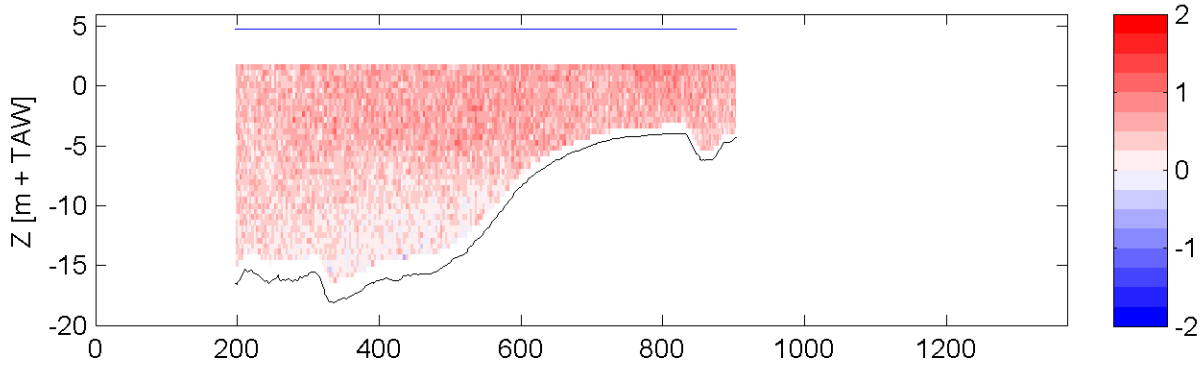
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3083Ktlr_sub.csv	Location: Transect K

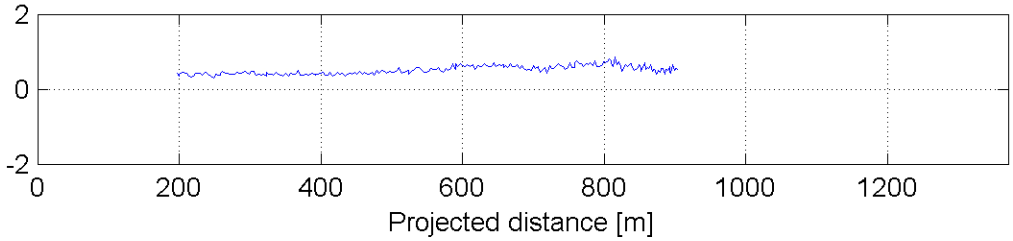
Parallel Current Velocity [m/s]



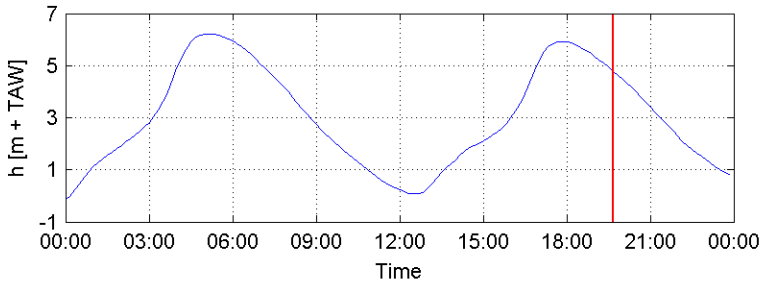
Perpendicular Current Velocity [m/s]



Depth Averaged Velocity [m/s]



Tidal Elevation 11-Mar-2008



HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

19:37 - 19:41

Time after HW [HH:MM]

1:49

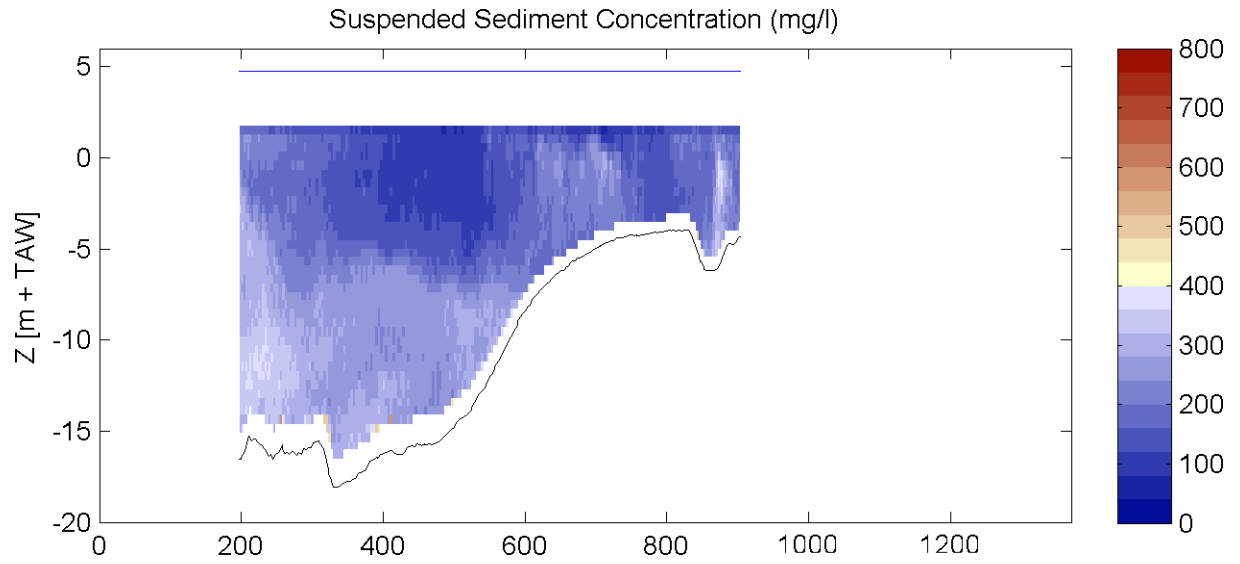
Data Processed by: IMDC

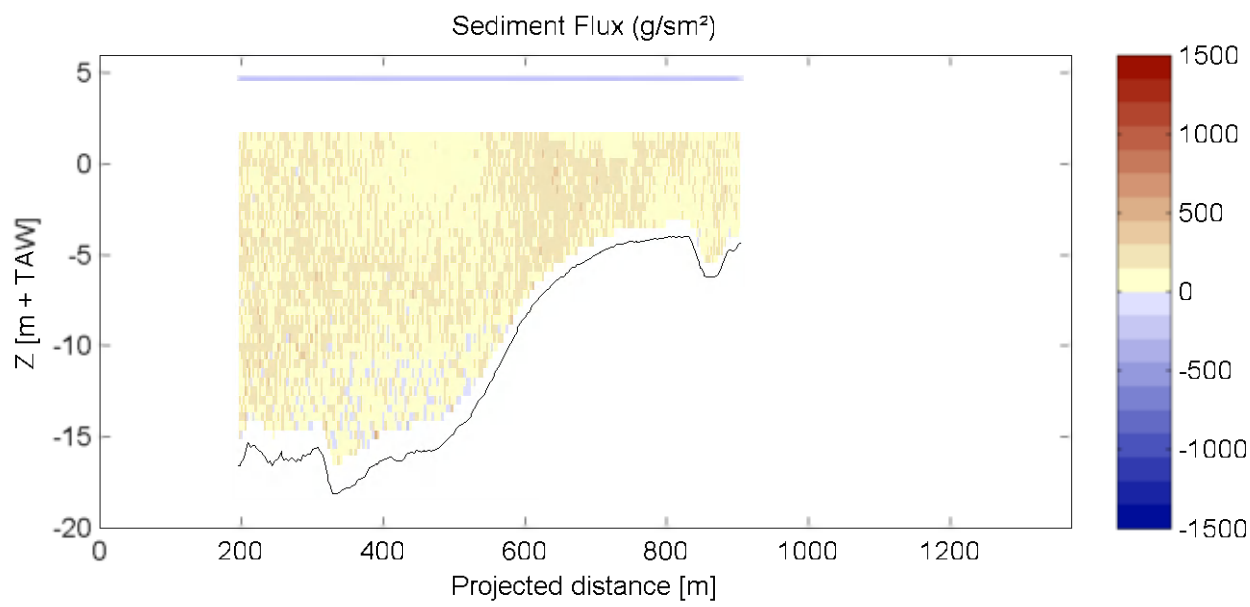
In association with : WL | delft hydraulics, GEMS International

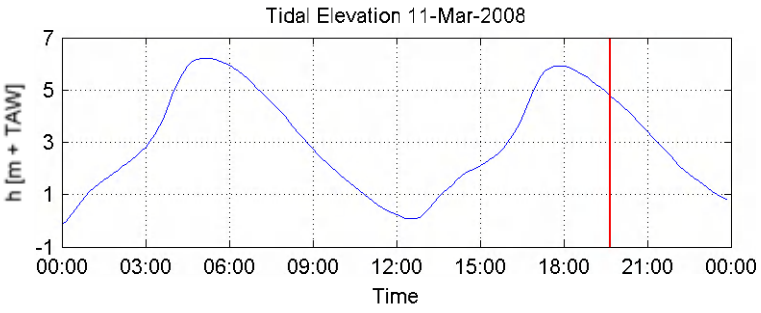
I/RA/11283/07.089/MSA

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
Sourcefile: 3083Ktlr_sub.csv	Location: Transect K







HW/LW:
05:00: h = 6.22 m+TAW
12:30: h = 0.08 m+TAW
17:50: h = 5.93 m+TAW

Date / Time [MET] :

11-Mar-2008

19:37 - 19:41

Time after HW [HH:MM]

1:49

Data Processed by: IMDC

In association with :

I/RA/11283/07.089/MSA

APPENDIX H. DISCHARGE AND SEDIMENT FLUX FOR THE TOTAL CROSS-SECTION

Discharge distribution over the cross section: positive is from dock to river

Filename	*Time to HW [hh:mm]*	*Qmid [m³/s]*	*Qtop [m³/s]*	*Qbottom [m³/s]*	*Qleft [m³/s]*	*Qright [m³/s]*	*Qtotal [m³/s]*
3002Ktrl	2:10	5587	1603	457	243	611	8501
3004Klr	2:34	7202	1950	587	737	684	11160
3006Ktrl	2:51	8071	2268	670	384	689	12082
3008Ktlr	3:06	7760	2298	630	1217	867	12772
3010Ktrl	3:24	8660	2392	691	641	707	13091
3012Ktlr	3:43	7913	2325	654	1341	1019	13253
3014Ktrl	4:05	7568	2359	648	612	663	11850
3016Ktlr	4:22	6410	2106	552	1103	932	11103
3017Ktrl	4:52	6338	1845	528	314	650	9675
3019Ktlr	5:12	5542	1808	485	1078	267	9180
3021Ktrl	5:28	5544	1826	473	736	495	9074
3023Ktlr	5:49	4987	1678	439	828	799	8730
3025Ktrl	6:02	4958	1740	432	800	536	8467
3027Ktlr	6:21	4338	1508	390	1044	304	7584
3029Ktrl	6:35	4337	1548	393	469	472	7218
3031Ktlr	6:51	3653	1288	325	816	195	6277
3033Ktrl	7:08	3502	1216	308	614	318	5957
3035Ktlr	7:21	2912	1013	248	877	545	5595
3037Ktrl	-5:06	1854	654	151	284	735	3678
3039Ktlr	-4:51	295	182	14	190	-332	350
3041Ktrl	-4:33	-1550	-400	-151	-216	-828	-3145
3043Ktlr	-4:22	-2557	-625	-239	-474	-697	-4592
3045Ktrl	-4:09	-3049	-774	-273	-707	-1268	-6071
3047Ktlr	-3:48	-3866	-1211	-341	-369	-612	-6398
3049Ktrl	-3:21	-4600	-1386	-399	-379	-590	-7354
3051Ktlr	-3:04	-4305	-1184	-360	-624	-643	-7115
3053Ktrl	-2:50	-4056	-1085	-342	-612	-236	-6331
3055Ktlr	-2:32	-4412	-1328	-370	-346	-125	-6581
3057Ktrl	-2:13	-4703	-1366	-395	-329	-750	-7542
3059Ktlr	-1:53	-5577	-1770	-483	-352	-575	-8757
3061Ktrl	-1:37	-6862	-2141	-583	-197	-620	-10403
3063Ktlr	-1:14	-10289	-3093	-870	-434	-645	-15330
3065Ktrl	-0:51	-12443	-3415	-984	-384	-1659	-18885
3067Ktlr	-0:33	-11246	-2751	-904	-1103	-920	-16924
3069Ktrl	-0:18	-8384	-2020	-672	-522	-1646	-13243
3071Ktlr	0:00	-5892	-1360	-465	-683	-830	-9231
3073Ktrl	0:18	-3921	-775	-303	-369	-672	-6040
3075Ktlr	0:34	-2468	-254	-198	-1377	-641	-4939
3077Ktrl	0:58	-545	356	-32	37	917	732
3079Ktlr	1:15	895	698	89	-957	487	1211

Filename	*Time to HW [hh:mm]*	*Qmid [m³/s]*	*Qtop [m³/s]*	*Qbottom [m³/s]*	*Qleft [m³/s]*	*Qright [m³/s]*	*Qtotal [m³/s]*
3081Ktrl	1:31	2812	1065	241	381	531	5029
3083Ktlr	1:49	3906	1303	325	1063	814	7411

Discharge distribution over the cross section: positive is from dock to river

Filename	*Time to HW [hh:mm]*	*Fmid [kg/s]*	*Ftop [kg/s]*	*Fbottom [kg/s]*	*Fleft [kg/s]*	*Fright [kg/s]*	*Ftotal [kg/s]*
3002Ktrl	2:10	1526	237	209	79	339	2390
3004Klr	2:34	1908	319	291	157	518	3194
3006Ktrl	2:51	1889	347	448	111	572	3368
3008Ktlr	3:06	2405	497	393	219	809	4322
3010Ktrl	3:24	2953	640	459	251	677	4979
3012Ktlr	3:43	3309	729	426	272	1053	5788
3014Ktrl	4:05	4058	883	636	164	722	6463
3016Ktlr	4:22	4067	917	540	276	614	6414
3017Ktrl	4:52	3552	759	446	138	547	5440
3019Ktlr	5:12	3033	705	319	354	152	4563
3021Ktrl	5:28	3340	736	396	281	263	5016
3023Ktlr	5:49	2806	683	315	269	408	4482
3025Ktrl	6:02	2515	677	295	217	280	3983
3027Ktlr	6:21	2127	578	232	275	128	3340
3029Ktrl	6:35	2078	556	213	132	229	3209
3031Ktlr	6:51	1687	439	181	200	78	2586
3033Ktrl	7:08	1557	419	159	161	125	2421
3035Ktlr	7:21	1159	320	108	170	193	1951
3037Ktrl	-5:06	641	194	58	75	355	1324
3039Ktlr	-4:51	88	39	3	43	-104	69
3041Ktrl	-4:33	-433	-72	-62	-54	-214	-835
3043Ktlr	-4:22	-652	-93	-95	-130	-191	-1161
3045Ktrl	-4:09	-713	-118	-132	-180	-629	-1772
3047Ktlr	-3:48	-704	-144	-128	-79	-144	-1199
3049Ktrl	-3:21	-742	-135	-212	-66	-94	-1249
3051Ktlr	-3:04	-679	-130	-204	-129	-85	-1226
3053Ktrl	-2:50	-692	-131	-173	-116	-30	-1141
3055Ktlr	-2:32	-855	-168	-187	-73	-31	-1314
3057Ktrl	-2:13	-1049	-185	-193	-88	-187	-1701
3059Ktlr	-1:53	-1658	-274	-369	-95	-465	-2860
3061Ktrl	-1:37	-1877	-295	-465	-42	-396	-3074
3063Ktlr	-1:14	-2735	-523	-486	-75	-309	-4128
3065Ktrl	-0:51	-3510	-673	-611	-98	-921	-5812
3067Ktlr	-0:33	-3777	-628	-570	-352	-446	-5773
3069Ktrl	-0:18	-3250	-534	-410	-202	-690	-5086
3071Ktlr	0:00	-2705	-473	-265	-365	-316	-4124
3073Ktrl	0:18	-2031	-271	-240	-249	-235	-3026
3075Ktlr	0:34	-1008	-59	-140	-633	-197	-2037
3077Ktrl	0:58	-166	66	-12	17	376	283
3079Ktlr	1:15	141	103	21	-301	61	24

Filename	*Time to HW [hh:mm]*	*Fmid [kg/s]*	*Ftop [kg/s]*	*Fbottom [kg/s]*	*Fleft [kg/s]*	*Fright [kg/s]*	*Ftotal [kg/s]*
3081Ktrl	1:31	602	139	80	148	83	1052
3083Ktlr	1:49	743	162	130	317	164	1515

Concentration distribution over the cross section.

Filename	*Time to HW [hh:mm]*	*Cmid [mg/l]*	*Ctop [mg/l]*	*Cbottom [mg/l]*	*Cleft [mg/l]*	*Cright [mg/l]*	*Ctotal [mg/l]*
3002Ktrl	2:10	273	148	458	324	555	281
3004Klr	2:34	265	164	497	213	758	286
3006Ktrl	2:51	234	153	670	289	830	279
3008Ktlr	3:06	310	216	623	180	933	338
3010Ktrl	3:24	341	267	664	391	958	380
3012Ktlr	3:43	418	313	651	203	1033	437
3014Ktrl	4:05	536	374	981	267	1090	545
3016Ktlr	4:22	635	435	978	250	659	578
3017Ktrl	4:52	560	411	844	438	840	562
3019Ktlr	5:12	547	390	658	328	570	497
3021Ktrl	5:28	602	403	838	382	532	553
3023Ktlr	5:49	563	407	717	325	511	513
3025Ktrl	6:02	507	389	682	271	522	470
3027Ktlr	6:21	490	383	596	264	419	440
3029Ktrl	6:35	479	359	542	282	486	445
3031Ktlr	6:51	462	341	557	245	401	412
3033Ktrl	7:08	445	345	516	262	394	406
3035Ktlr	7:21	398	316	434	194	355	349
3037Ktrl	-5:06	346	297	385	265	482	360
3039Ktlr	-4:51	299	213	213	226	314	197
3041Ktrl	-4:33	279	181	411	248	259	266
3043Ktlr	-4:22	255	149	396	274	273	253
3045Ktrl	-4:09	234	152	483	254	496	292
3047Ktlr	-3:48	182	119	376	214	235	187
3049Ktrl	-3:21	161	97	531	174	159	170
3051Ktlr	-3:04	158	110	566	207	131	172
3053Ktrl	-2:50	171	121	505	189	127	180
3055Ktlr	-2:32	194	126	505	210	251	200
3057Ktrl	-2:13	223	135	489	267	249	226
3059Ktlr	-1:53	297	155	764	270	808	327
3061Ktrl	-1:37	274	138	797	211	638	295
3063Ktlr	-1:14	266	169	558	172	479	269
3065Ktrl	-0:51	282	197	621	256	555	308
3067Ktlr	-0:33	336	228	631	319	485	341
3069Ktrl	-0:18	388	265	610	386	419	384
3071Ktlr	0:00	459	348	571	534	380	447
3073Ktrl	0:18	518	349	791	675	351	501
3075Ktlr	0:34	408	231	705	460	307	412
3077Ktrl	0:58	304	187	368	475	410	386
3079Ktlr	1:15	157	147	236	314	125	20

Filename	*Time to HW [hh:mm]*	*Cmid [mg/l]*	*Ctop [mg/l]*	*Cbottom [mg/l]*	*Cleft [mg/l]*	*Cright [mg/l]*	*Ctotal [mg/l]*
3081Ktrl	1:31	214	130	332	388	156	209
3083Ktlr	1:49	190	124	398	298	201	204

APPENDIX I. AVERAGE SEDIMENT CONCENTRATION FOR THE TOTAL CROSS-SECTION

Transect name	*Time [hh:mm MET]*	*Time after HW [hh:mm]*	*Average measured SS Concentration [mg/l]*
3002Ktrl	7:07	2:10	331
3004Klr	7:32	2:34	311
3006Ktrl	7:48	2:51	260
3008Ktlr	8:04	3:06	321
3010Ktrl	8:21	3:24	349
3012Ktlr	8:41	3:43	399
3014Ktrl	9:02	4:05	509
3016Ktlr	9:20	4:22	612
3017Ktrl	9:49	4:52	521
3019Ktlr	10:10	5:12	508
3021Ktrl	10:26	5:28	556
3023Ktlr	10:47	5:49	540
3025Ktrl	11:00	6:02	474
3027Ktlr	11:19	6:21	459
3029Ktrl	11:35	6:35	418
3031Ktlr	11:49	6:51	437
3033Ktrl	12:05	7:08	406
3035Ktlr	12:19	7:21	416
3037Ktrl	12:42	-5:06	328
3039Ktlr	12:57	-4:51	339
3041Ktrl	13:14	-4:33	278
3043Ktlr	13:26	-4:22	272
3045Ktrl	13:38	-4:09	246
3047Ktlr	13:59	-3:48	196
3049Ktrl	14:25	-3:21	172
3051Ktlr	14:42	-3:04	177
3053Ktrl	14:57	-2:50	183
3055Ktlr	15:15	-2:32	201
3057Ktrl	15:34	-2:13	261
3059Ktlr	15:54	-1:53	335
3061Ktrl	16:09	-1:37	322
3063Ktlr	16:32	-1:14	255
3065Ktrl	16:55	-0:51	280
3067Ktlr	17:14	-0:33	331
3069Ktrl	17:29	-0:18	390
3071Ktlr	17:48	0:00	460
3073Ktrl	18:06	0:18	531
3075Ktlr	18:22	0:34	405
3077Ktrl	18:46	0:58	276
3079Ktlr	19:03	1:15	234
3081Ktrl	19:19	1:31	263

3083Ktlr	19:37	1:49	240

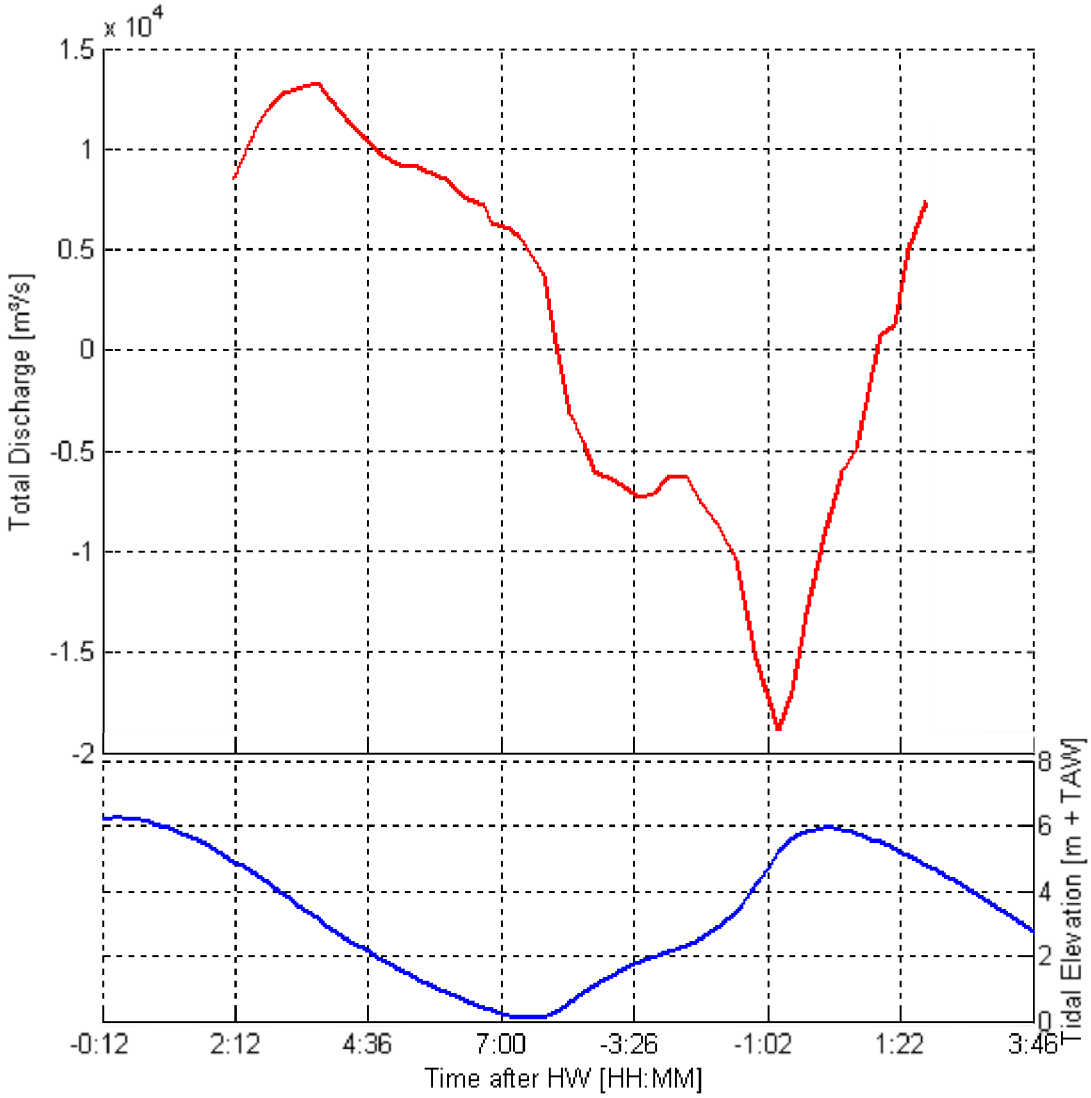
Tide	*Concentration [mg/l]*		
	Average	*Minimum*	*Maximum*
Ebb	409	234	612
Flood	269	172	390

APPENDIX J.

TEMPORAL VARIATION OF TOTAL FLUX, TOTAL DISCHARGE AND SUSPENDED SEDIMENT CONCENTRATION

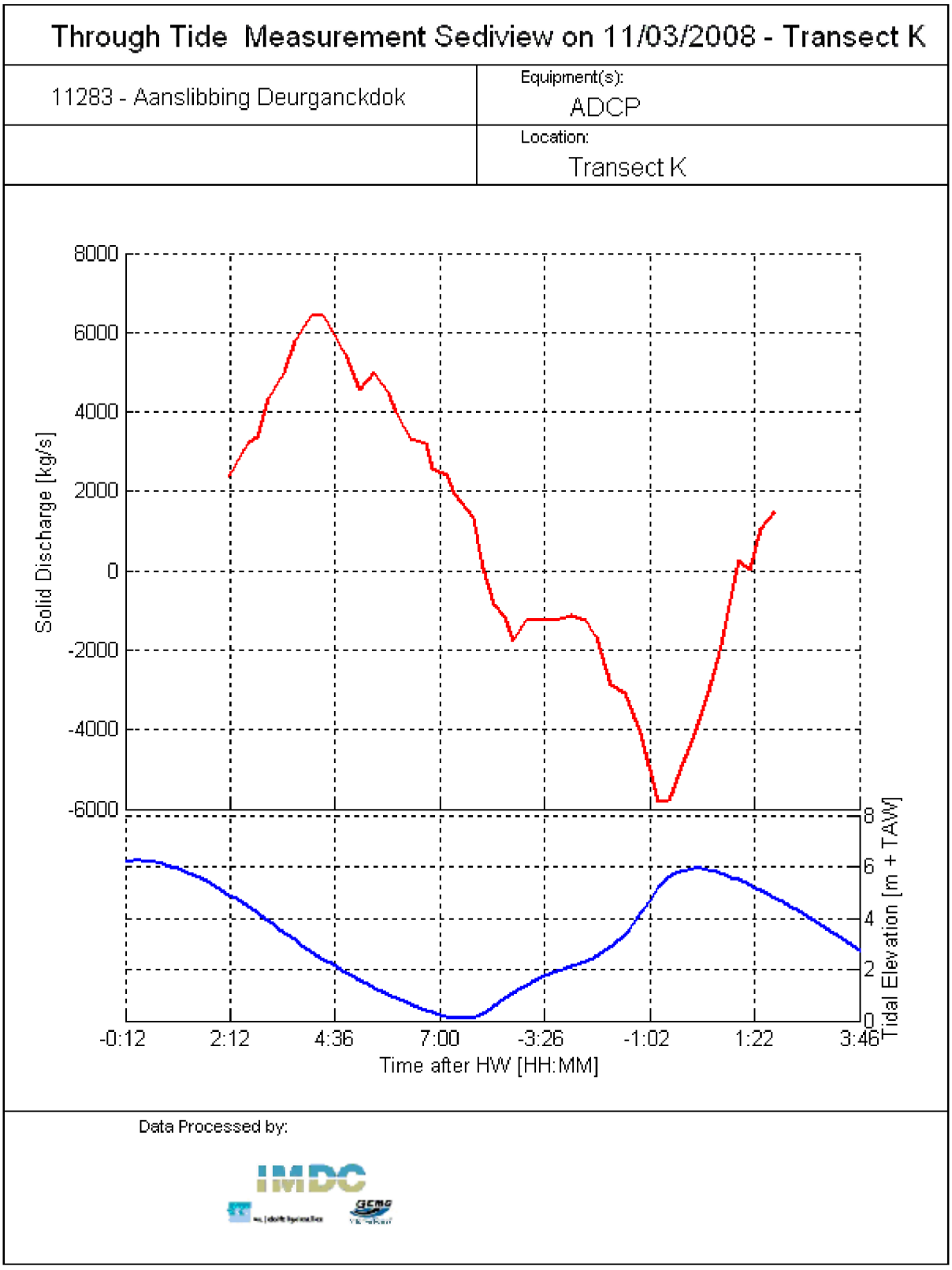
Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
	Location: Transect K



Data Processed by:

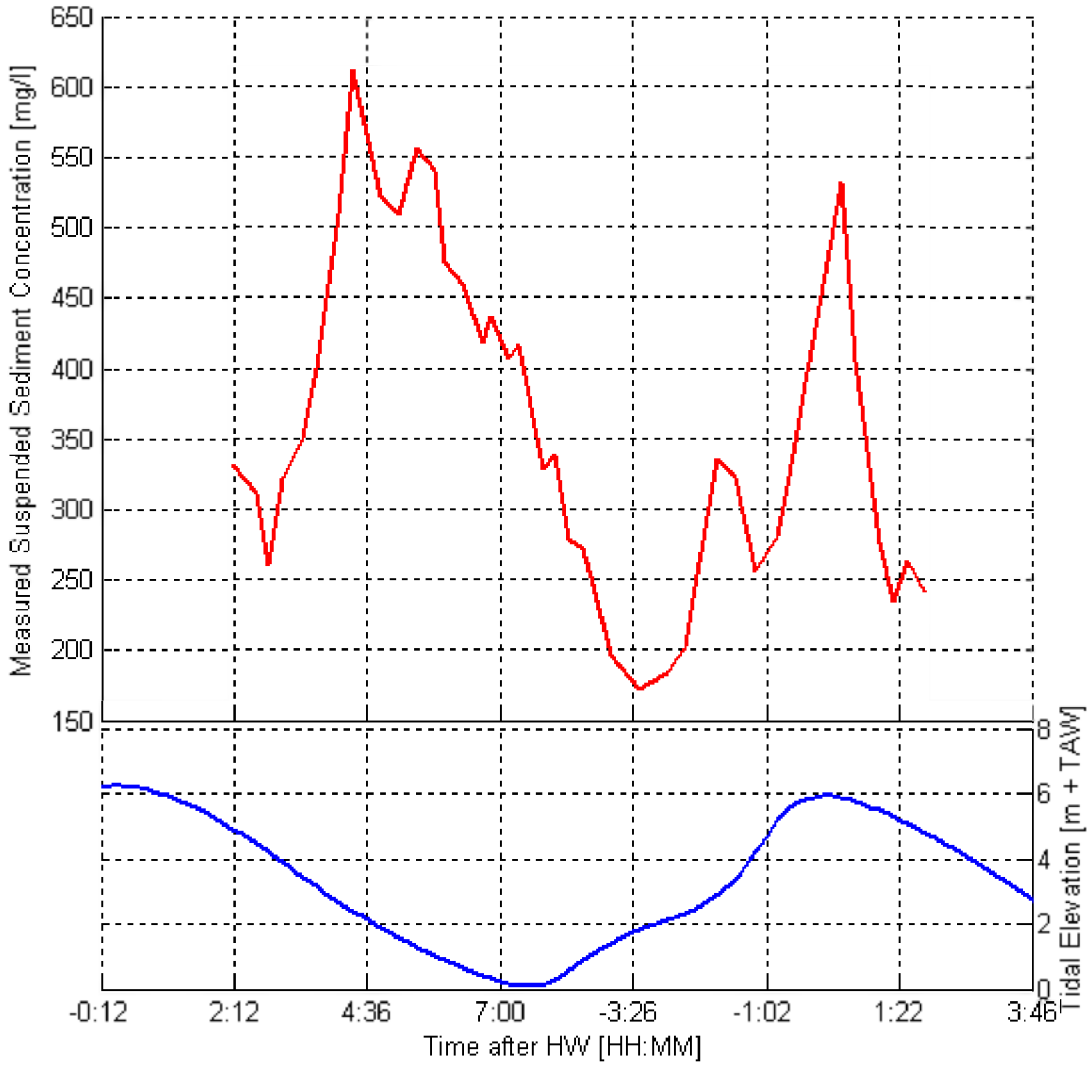
Total discharge through the measured cross section, positive is from dock to river



Total flux through the measured cross section, positive is from dock to river

Through Tide Measurement Sediview on 11/03/2008 - Transect K

11283 - Aanslibbing Deurganckdok	Equipment(s): ADCP
	Location: Transect K



Data Processed by:

Suspended sediment concentration through the measured cross section

APPENDIX K.

OVERVIEW OF HCBS2 AND AANSLIBBING DEURGANCKDOK REPORTS

Report	Description of HCBS2
Ambient Conditions Lower Sea Scheldt	
5.3	Overview of ambient conditions in the river Scheldt – January-June 2006 (I/RA/11291/06.088/MSA)
5.4	Overview of ambient conditions in the river Scheldt – July-December 2006 (I/RA/11291/06.089/MSA)
5.5	Overview of ambient conditions in the river Scheldt : RCM-9 buoy 84 & 97 (1/1/2007 -31/3/2007) (I/RA/11291/06.090/MSA)
5.6	Analysis of ambient conditions during 2006 (I/RA/11291/06.091/MSA)
Calibration	
6.1	Winter Calibration (I/RA/11291/06.092/MSA)
6.2	Summer Calibration and Final Report (I/RA/11291/06.093/MSA)
Through tide Measurements Winter 2006	
7.1	21/3 Scheldewacht – Deurganckdok – Salinity Distribution (I/RA/11291/06.094/MSA)
7.2	22/3 Parel 2 – Deurganckdok (I/RA/11291/06.095/MSA)
7.3	22/3 Laure Marie – Liefkenshoek (I/RA/11291/06.096/MSA)
7.4	23/3 Parel 2 – Schelle (I/RA/11291/06.097/MSA)
7.5	23/3 Laure Marie – Deurganckdok (I/RA/11291/06.098/MSA)
7.6	23/3 Veremans Waarde (I/RA/11291/06.099/MSA)
HCBS Near bed continuous monitoring (Frames)	
8.1	Near bed continuous monitoring winter 2006 (I/RA/11291/06.100/MSA)
INSSEV	
9	Settling Velocity - INSSEV summer 2006 (I/RA/11291/06.102/MSA)
Cohesive Sediment	
10	Cohesive sediment properties summer 2006 (I/RA/11291/06.103/MSA)
Through tide Measurements Summer 2006	
11.1	Through Tide Measurement Sediview and Siltprofiler 27/9 Stream - Liefkenshoek (I/RA/11291/06.104/MSA)
11.2	Through Tide Measurement Sediview 27/9 Veremans - Raai K (I/RA/11291/06.105/MSA)
11.3	Through Tide Measurement Sediview and Siltprofiler 28/9 Stream - Raai K (I/RA/11291/06.106/MSA)
11.4	Through Tide Measurement Sediview 28/9 Veremans - Waarde(I/RA/11291/06.107/MSA)
11.5	Through Tide Measurements Sediview 28/9 Parel 2 - Schelle (I/RA/11291/06.108/MSA)
11.6	Through Tide measurement 26/9 Scheldewacht – Deurganckdok – Salinity Distribution (I/RA/11291/06.161/MSA)

Analysis	
12	Report concerning the presence of HCBS layers in the Scheldt river (I/RA/11291/06.109/MSA)

Report	Description of Opvolging aanslibbing Deurganckdok between April 2006 till March 2007
Sediment Balance: Bathymetry surveys, Density measurements, Maintenance and construction dredging activities	
1.1	Sediment Balance: Three monthly report 1/4/2006 – 30/06/2006 (I/RA/11283/06.113/MSA)
1.2	Sediment Balance: Three monthly report 1/7/2006 – 30/09/2006 (I/RA/11283/06.114/MSA)
1.3	Sediment Balance: Three monthly report 1/10/2006 – 31/12/2006 (I/RA/11283/06.115/MSA)
1.4	Sediment Balance: Three monthly report 1/1/2007 – 31/03/2007 (I/RA/11283/06.116/MSA)
1.5	Annual Sediment Balance (I/RA/11283/06.117/MSA)
1.6	Sediment balance Bathymetry: 2005 – 3/2006 (I/RA/11283/06.118/MSA)
Factors contributing to salt and sediment distribution in Deurganckdok: Salt-Silt (OBS3A) & Frame measurements, Through tide measurements (SiltProfiling & ADCP)	
2.1	Through tide measurement Siltprofiler 21/03/2006 Laure Marie (I/RA/11283/06.087/WGO)
2.2	Through tide measurement Siltprofiler 26/09/2006 Stream (I/RA/11283/06.068/MSA)
2.3	Through tide measurement Sediview spring tide 22/03/2006 Veremans (I/RA/11283/06.110/BDC)
2.4	Through tide measurement Sediview spring tide 27/09/2006 Parel 2 (I/RA/11283/06.119/MSA)
2.5	Through tide measurement Sediview average tide 24/10/2007 Parel 2 (I/RA/11283/06.120/MSA)
2.6	Salt-Silt distribution & Frame Measurements Deurganckdok 13/3/2006 – 31/05/2006 (I/RA/11283/06.121/MSA)
2.7	Salt-Silt distribution & Frame Measurements Deurganckdok 15/07/2006 – 31/10/2006 (I/RA/11283/06.122/MSA)
2.8	Salt-Silt distribution & Frame Measurements Deurganckdok 12/02/2007 – 18/04/2007 (I/RA/11283/06.123/MSA)
2.9	Calibration stationary equipment autumn (I/RA/11283/07.095/MSA)

Report	Description of Opvolging aanslibbing Deurganckdok between April 2006 till March 2007
Boundary Conditions: Upriver Discharge, Salt concentration Scheldt, Bathymetric evolution in access channels, dredging activities in Lower Sea Scheldt and access channels	
3.1	Boundary conditions: Three monthly report 1/1/2007 – 31/03/2007 (I/RA/11283/06.127/MSA) including HCBS 2 report 5.5
~~3.2~~	~~Boundary condtions: Annual report (I/RA/11283/06.128/MSA)~~[1]
Analysis	
4.1	Analysis of Siltation Processes and Factors (I/RA/11283/06.129/MSA)

[1] considered in report 5.6 'Analysis of ambient conditions during 2006' (I/RA/11291/06.091/MSA) in the framework of the study 'Extension of the study about density currents in the Beneden Zeeschelde'